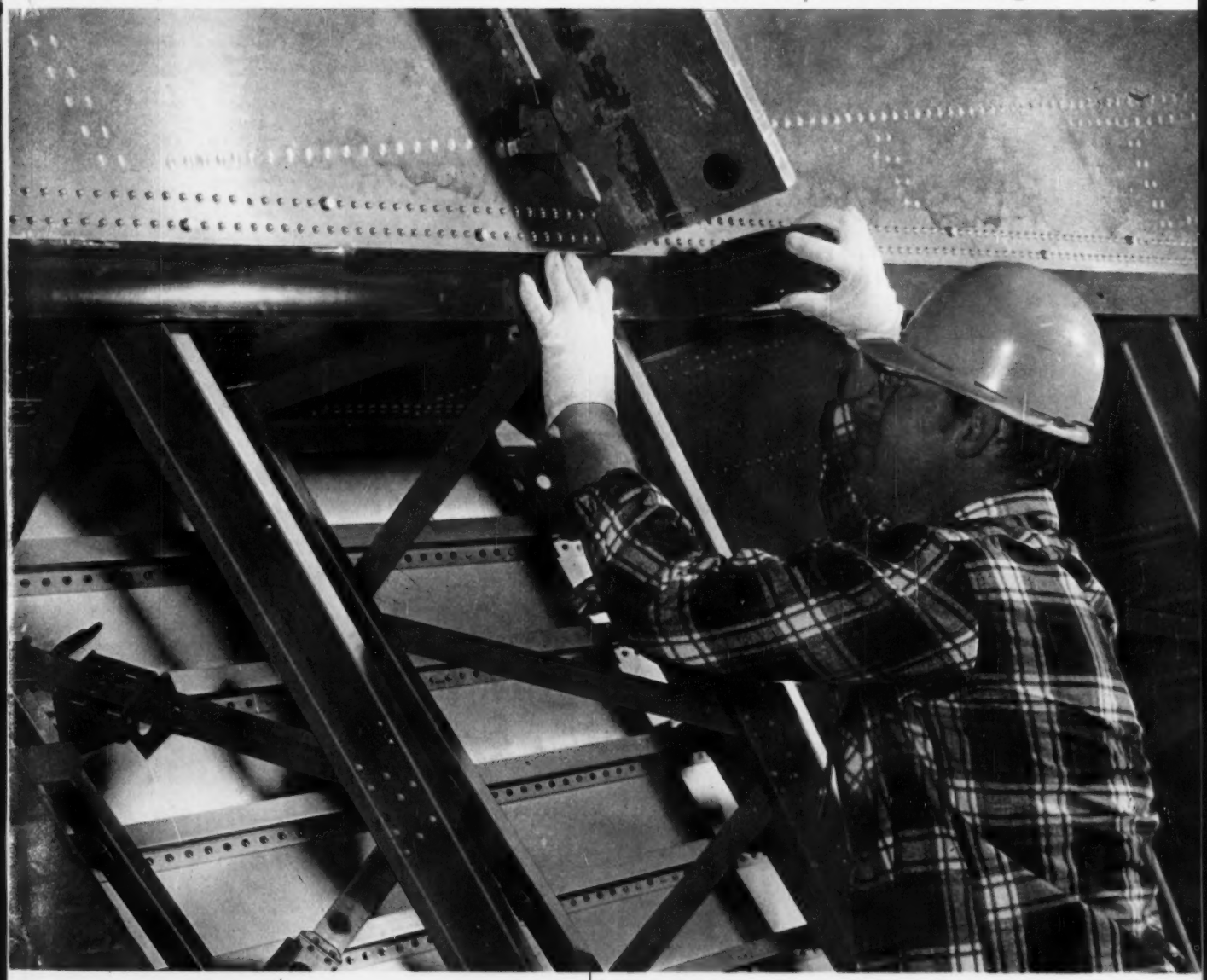
The IRON AGE

March 5, 1959 A Chilton Publication The National Metalworking Weekly



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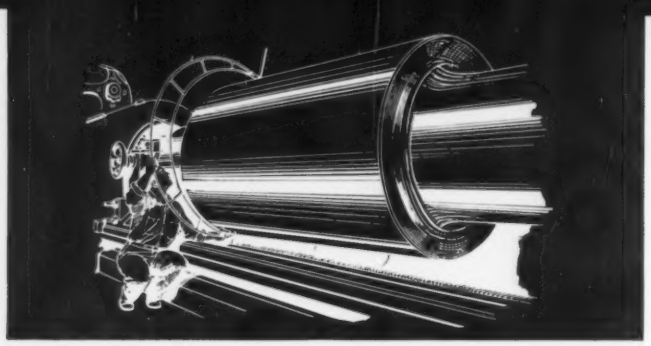
Will Mill Expansion Spark Equipment Boom? – P. 37

Let's Be Realistic About Labor Relations – P. 49

Digest of the Week – P. 2-3



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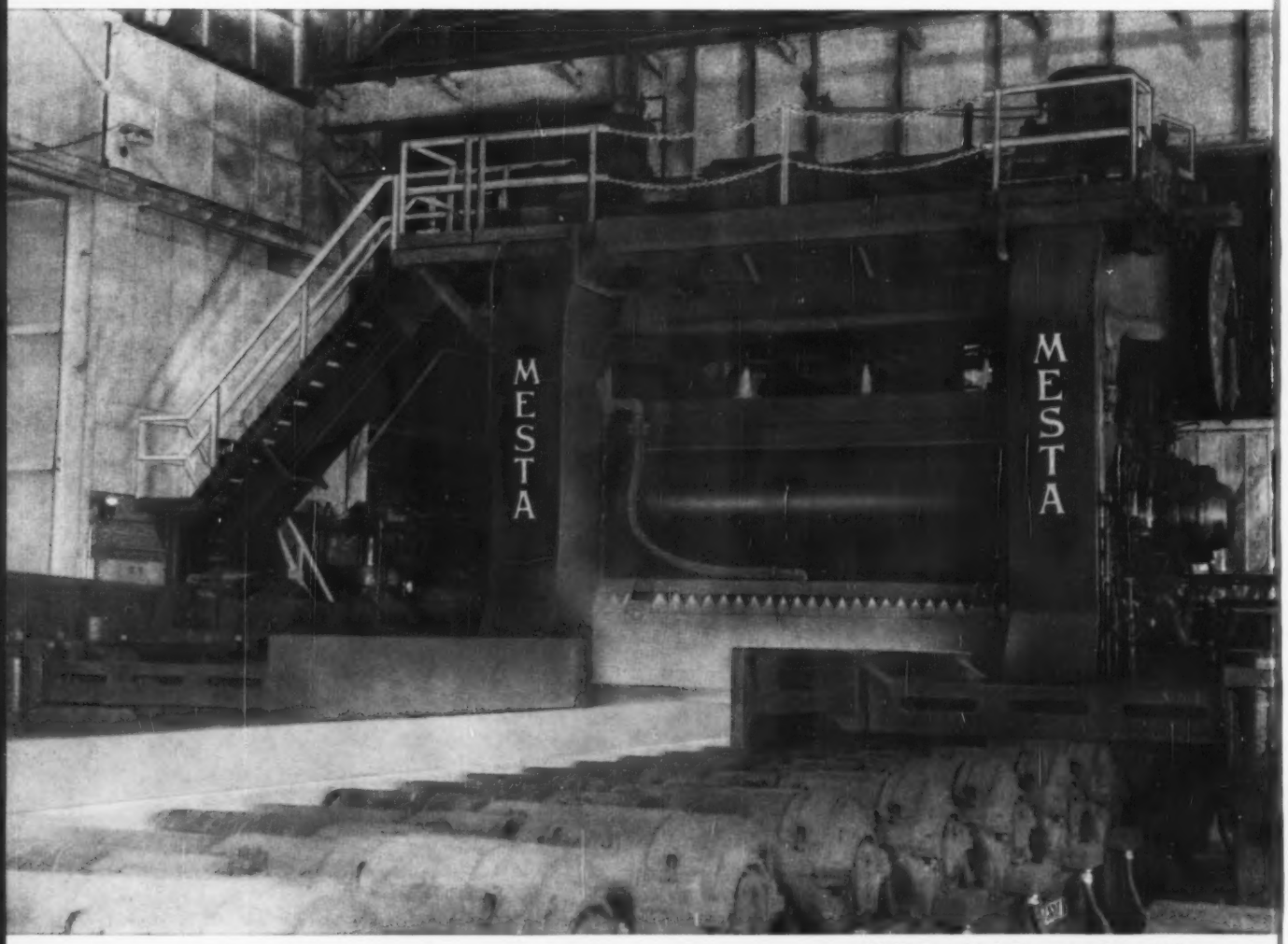

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March 5, 1959—Vol. 183, No. 10

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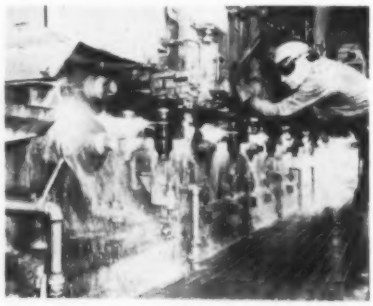
Upsurge Due? — Forecasts that steelmakers will spend $1 billion on



capital improvements this year may be conservative. Enthusiasm for new equipment is moving upward with the ingot rate. P. 37

TAX MESS

Interstate Taxes—Supreme Court decision gives states the right to tax sales of out-of-state companies. It creates a major tax mess, with double taxation a dangerous possibility. There's no easy solution in sight. P. 40

PRE-TESTING

More Do It — The government will pre-test about 1.5 million job applicants for industry this year. More companies are using this service. P. 42

LABOR REPORT

How Deep Is Bitterness?—There's no doubt labor-management relations are strained. But in rela-

Metalworking

◀ **ADHESIVE BOND:** Worker applies Minnesota Mining & Mfg. Co.'s bonding film adhesive on wing spar of Convair 880 jet airliner wing. Before riveting of wing skin, red protective coating is stripped, leaving clear adhesive film. P. 75

tion to the situation 10-15 years ago, things are not too bad. A special report by Tom Campbell. P. 49

LOBBYING

A Deductible Expense? — Management may find the cost of political lobbying is stiffer than it had expected. Supreme Court says money spent for lobbying is not necessarily tax deductible. P. 57

FEATURE ARTICLE

HOW TO GET MORE FOR YOUR ADHESIVES DOLLAR

Versatile Bonds—Adhesives will bond almost any material you can name. They do a lot more than just stick things together. Structural adhesive bonding now stands side by side with mechanical and fusion methods of joining. P. 75

Service Needs Govern—Base selection of adhesives on performance required. In many cases, adhesive bonding is the only practical method of fastening. Each main adhesives group has its own properties to determine use. P. 76

Thermosetting for Strength—As the name implies, thermosetting adhesives set or cure by application of heat and pressure. The result is a rigid, high-strength, durable bond. P. 79

Low-Cost Thermoplastics—These adhesives are based mainly on certain elastomers and thermoplastic resins. While generally low in strength, they have wide application where cost is the most important factor. P. 84

For Middle Range—Thermosetting - thermoplastic adhesives are semi-rigid with medium strength. Neoprene and nitrile rubber adhesives are typical of this group. Big advantage is their low-cost application. P. 86

Method for Each Job—As adhesives vary, so do the techniques and tooling for working with them. Selection of method depends on demands of each job and the formulation used. P. 88

MARKETS & PRICES

COMPUTER OUTLOOK

Continued Growth — Computer sales, currently at $800 million a year, could triple by 1968, say GE marketers. They expect a big upsurge in sales to batch and continuous process industries. P. 59

CHEMICAL EXPANSION

Leveling Off—After spending a record $1.8 billion for new plant and equipment in 1958, chemical industry expansion is expected to level off during 1959-60. P. 39

ELECTRIC AUTOS

Making a Comeback?—Auto operating expense, noise, and smog are helping revive interest in electric autos. Two companies will be producing them soon. P. 53

TOOL PROGRAMMING

New Electronic System—A new automatic system permits use of simple word commands to direct complex machine operations. It was developed at MIT for the Air Force. P. 61

STEEL STRIKE

What Are the Odds? — There's considerable speculation on whether steel labor will extend its contracts if negotiations with management reach a deadlock. Don't count on it. P. 115

NEXT WEEK

DATA PROCESSING

Put It to Full Use—Data processing is often thought of as a way to save on clerical help. As a result, it's mis-used or under-used. Next week's feature tells how management can put an effective decision-making system to work.

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Here at the Erie Foundry Rebuilding "Hospital", we disassemble and inspect your forging hammer, remachine worn surfaces, true bearings, replace broken parts, repair cracked parts. Once the hammer is reassembled, tested and put back in operation, it'll be as spry and sound as a new machine—but at one-third the cost!

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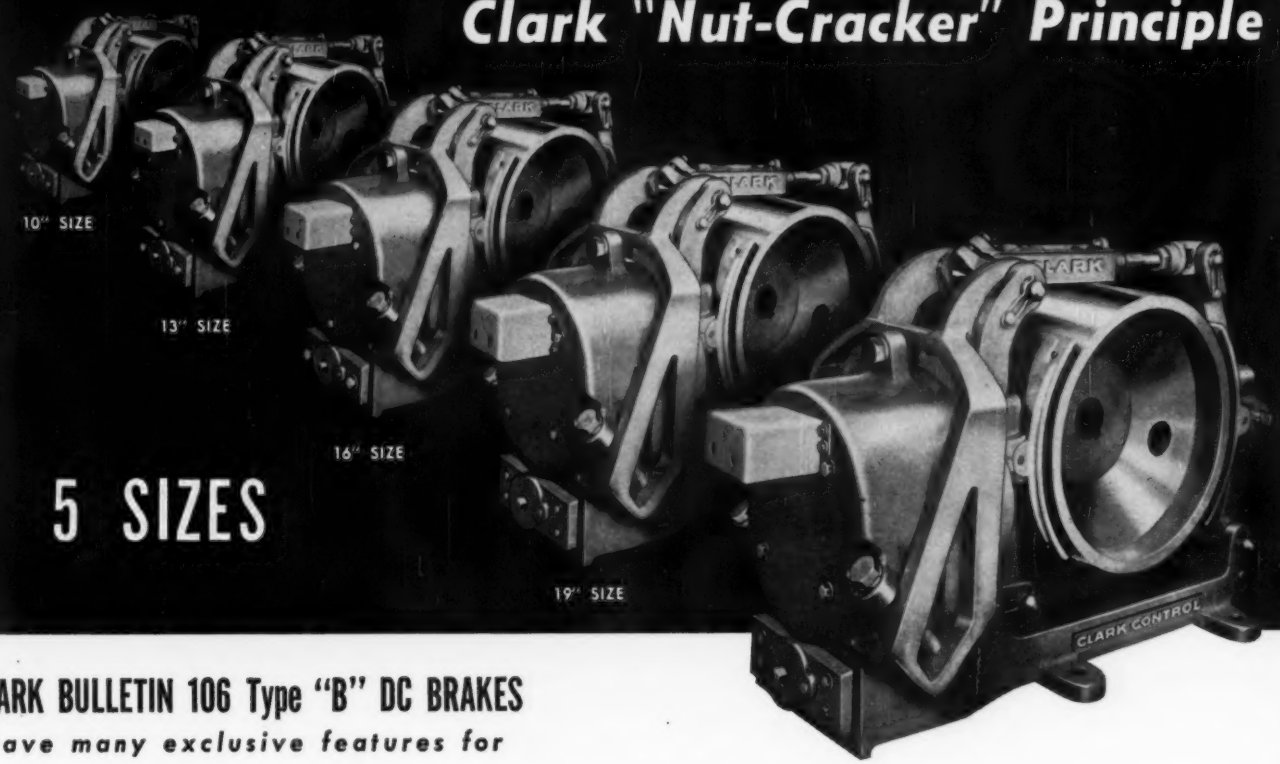

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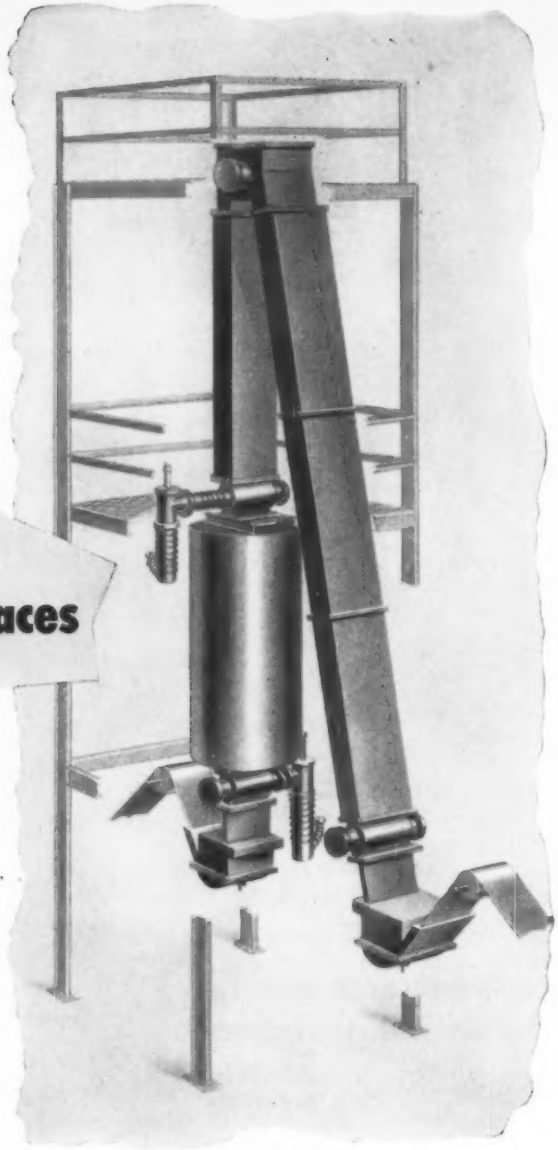

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The Steel Labor Hassle

Will There Be a Bitter Strike?

Elements for an impasse in steel labor negotiations are building up fast. By June—when both sides get down to brass tacks—opposing pressures will be extreme.

Some observers see a good chance for a strikeless settlement: The thought is that cool and logical heads will prevail. Others, who are in the majority, think otherwise.

There would be no strike—and no steel price increase—if the steel union decided to forego its wage demands; at least this year. That, of course, is daydreaming to the extreme.

It is likely that steel firms would forego a steel price increase if the wage settlement were to be non-inflationary. But what is a non-inflationary wage increase? It may not exist under present economic conditions.

Steel firms have been pushed around for years by a powerful steel union. Five times in the past 13 years the steel industry has been shut down by the union's attempt to gain a big package. Thus accusations that steel firms have no guts when fighting the union are false.

Government and consumer pressures in the past have forced steel firms to buckle under and accept a contract they knew was wrong. But they had no alternative. Those who were yelling "hold the line" often added their two cents to the pressure for settlement.

This year the steel industry is dead set against a contract that will force a raise in the price of steel. Some steel people claim there is nothing to negotiate. Whether this will be the view of other steel firms remains to be seen.

The steel union will not backtrack on its past pattern for a lush package. The bid for public and political support and the spending of large sums for advertising slogans and slick—but fictional—arguments show the union means to give the industry "the business."

A logical and commonsense argument can be built up for a settlement without a strike. But arguments as sound as the dollar used to be don't hold water in steel union negotiations. The union's drive for big deals is utterly unrelated to logic and cold fact. Its arguments are power- and emotion-laden.

If the union attempts to gain a steel wage package requiring a steel price increase, there will be a strike. If the steel union backs down and accepts a small raise—including fringe—there will be no strike.

It's as simple (?) as that!

Tom Campbell

Editor-in-Chief

CASE HISTORIES

Photo: courtesy Ready Tool Company

Bearing Design Helps Live Center Maker Achieve Accuracy of .000050"!

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Live center maker requires bearing design that will help achieve . . . and maintain . . . live center accuracy of .000050", under combination radial and thrust loads.

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Refractory for Large Voids

A new refractory product is said to be the answer for voids too large for mortar and too small to key in regular castables, plastics or ramming mixes. The material's bonding strength prevents cracking and voids that commonly allow furnace gases to attack outer steel furnace casings. Short drying time and easy storage are added benefits. Maximum use is up to 3000°F. It's an air-setting trowelable mastic.

More Oxygen Converters

According to one timetable, oxygen converters will replace openhearths representing 50 million annual tons within the next 10 years. The prediction is based on the fact that about one-third of steelmaking capacity is provided by openhearths rated at less than 200 tons. Cost pressure will dictate replacement of this group.

Annealing Gets Data Setup

One of the most extensive data logging systems in the steel industry will be installed soon on a continuous annealing line. The system will log 50 items. Information will be used for control and other purposes.

Upturn in Foundry Business

Indications are that the foundry business is in an unexpectedly strong upswing. The trend seems strongest in the Midwest. Rate of gain is as much as 10 pct per month. If the upswing continues past March, foundrymen will have to watch their pig-iron supplies, as delivery could be slow. This would put grey-iron output at its strongest level since first-half 1957.

Lengthen Anodic Protection

A new alloy gives anodic protection of iron and steel structures exposed to sea water. An 8-lb anode has a projected service life of about 10 years in oil tank use. This compares with a 60 lb anode of high purity magnesium that generally lasts only 3 years. Further, the deposits of corrosion of the new material are soft and easily handled by pumps. In the smaller surface area of a home oil tank, the same 10-year life is obtained with a ½-lb anode. Controlled testing has shown effectiveness of protection.

Magnetic Tip Controls Iron

A new soldering iron uses magnetic force for automatic control of iron temperature. The unusual feature of this iron depends on the magnetic quality of a special alloy. When heat at the tip changes, a sensing element either makes or breaks an electrical contact as its magnetic qualities change.

Restrict to Defense Use

Congressmen are casting a wary eye on an Air Force request for $77 million to buy jet "cargo and training" planes described as "plush" types. The lawmakers want to know if the 45 planes—10 cargo carriers at $5.3 million each and 35 four place jet trainers—are intended for junkets by government officials. If so, they'll pounce on the military, demanding that all funds be restricted to defense uses.

Combine Grinding Methods

Just revealed is a new precision production grinding technique. It's a combining of the crush-truing and centerless types. For many small parts, it's effecting real cost savings in early installations around the country. Big advantage is in doubling up on process steps, often eliminating machining altogether.

Cut Civil Defense Program?

A lax attitude by the public toward bomb shelters may result in big cuts in the government's $100-million-a-year civil defense program. It's unreasonable, say some senators, to urge citizens to build bomb shelters, stockpile food, while at the same time we're told that the cold war is likely to continue for another 50 years.

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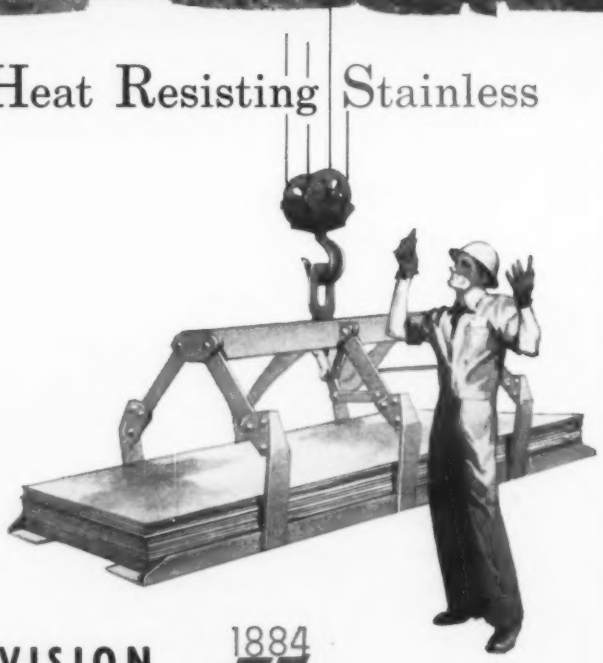
If you use heat resisting stainless, nothing beats Ingersoll . . . or Ingersoll service. Try us, and see.



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Supervisors

Sir—We are interested in securing 14 copies of the reprint of the article "Strengthen First Line Supervision to Avert Labor Troubles (Feb. 5 issue). We plan to distribute these to our field division office.—S. R. Ives, President, Armco Drainage & Metal Products, Inc., Middletown, O.

Sir—Will you please send us two copies of this article by Dr. Robert W. McMurry. — M. S. Fotheringham, President and General Manager, Steep Rock Iron Mines Ltd., Steep Rock Lake, Ontario, Can.

Sir—We made copies of "The Pattern of Weak First-line Supervision" on page 53 and sent it out to all supervision at the Ambridge and South Side Plants of the A. M. Byers Company. There has been quite an "uproar" regarding the word "synchophantic" and we are at a loss to explain it. We would appreciate it very much if you could define the word "synchophantic" so that we may pass it on to supervision.—G. E. Day, Manager Industrial Relations, A. M. Byers Co., Pittsburgh, Pa.

▪ As we assured Dr. McMurry and others as soon as the error was caught, we do know how to spell "sycophantic." How such a compound error got through our own copy editors and proofroom, we'll never know.

The error is particularly embarrassing because of the reader response to Dr. McMurry's article. At last count, over 3100 reprints had been requested and we had just ordered another 1000 to meet the continuing demand.

Incidentally, a sycophant is a stool pigeon, a tale bearer, a follower, a parasite.—Ed.

Russian Motives

Sir—Your editorial in the Feb. 5 issue on Russian trade aims should be enlarged and framed. Then it should be hung where the boys in Washington would see it every day. Then it should be ordered by the President that each man concerned should read it at least once each hour.—C. E. McKinney, Davies & McKinney, Erie, Pa.

"You'll do very well as a foreman, Ed. Already the boys are beginning to hate your guts!"

Auto Suppliers

Sir—We were particularly interested in your Special Report ("Why Auto Suppliers Face Stiffer Competition") appearing in the Jan. 22 issue.

It would be deeply appreciated if you will grant us permission to reproduce this article and distribute it to our employees in connection with our employee relation program. —The Zeller Corp., Fort Wayne Rd., Defiance, Ohio.

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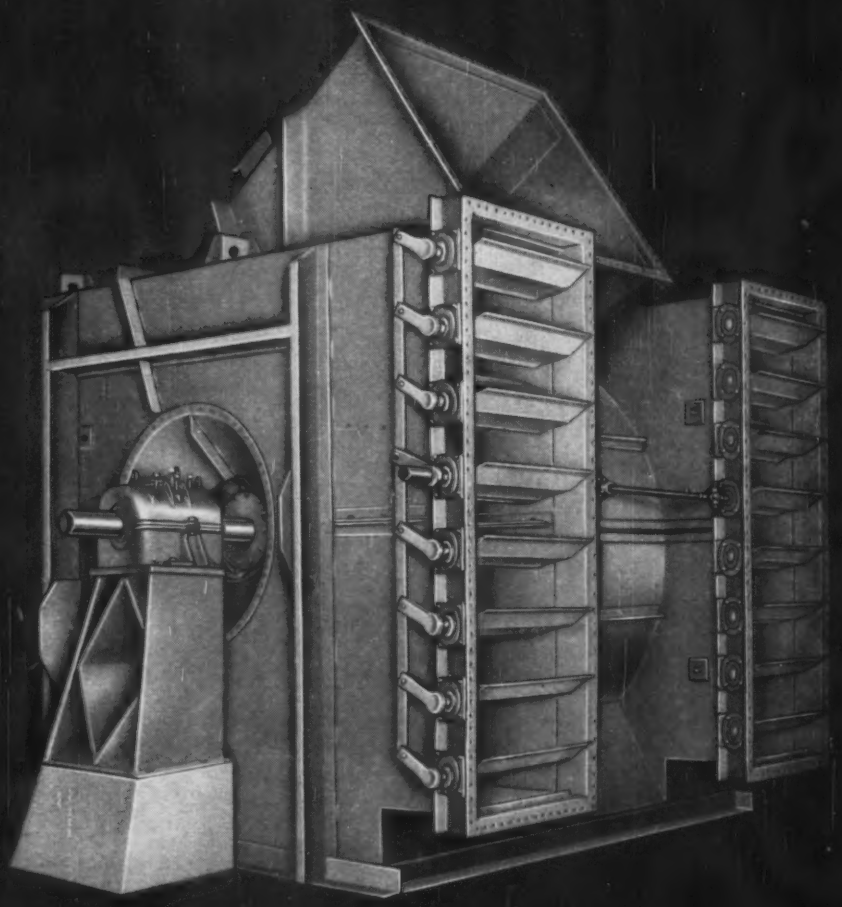

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Seasonal Tie

With spring practically around the corner, it's fitting the feature article on adhesives in this week's issue should appear right about now. We're inclined to think of this subject and the coming season together, because grampa always saved his gluing jobs until this time of year. Reason was, the smell of fish glue melting over the kitchen stove would make the place unlivable for days if he couldn't throw open all the windows and let the March winds clear the air.

Then too, this is when we usually made our kites—from newspaper glued in place with our own homemade flour-and-water paste.

Today's Problems—Modern adhesives have come a long way since then. While animal glues are still being made and used today, metalworking looks to the chemist's concoctions for answers to some of its stickier problems.

One of those problems is picking the right adhesive; there are literally thousands to choose from, each little variation providing a slightly different set of properties.

The article starting on p. 75—latest in our How to Get More for Your Metalworking Dollar series—gives the answer.

Special Service — Regarding experts: You'll see a list of all those who aided us at the end of the article. And especially helpful in guiding up through the adhesives maze were:

Bernard Gould, market development manager, Rubber & Asbestos Corp., Bloomfield, N. J.; E. F. Hess, product manager, Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co., St. Paul; and A. J. Slosser, industrial adhesives manager, Armstrong Cork Co., Lancaster, Pa.

Perfect Month

Who hasn't longed for a month when the calendar was the slave, not the master? Well the solution is here, although this "please-everyone" calendar has slim chances of success.

It reached our attention via the Gray Iron News, published by the Gray Iron Founders' Society. Just consider its many advantages, as the TV spielers say:

NEG	FRI	FRI	THU	WED	TUE	MON
8	7	6	5	4	3	2
16	15	14	13	12	11	9
23	22	21	20	19	18	17
31	30	29	28	27	26	24
38	37	36	35	34	33	32

First there's the unusual pattern of the days of the month. With this arrangement a customer can place an order on the 7th and get delivery on the 3rd.

Next there are two Fridays. This is a help because most buyers want shipment by Friday.

Then there are seven extra days in the last week. These will take care of all those shipments which must go out before the end of the month.

Other important features: No time allowed for non-productive Saturdays and Sundays so production can continue without week-end interference. No "first" of the month, ending forever those annoying "first of the month" bills. And for the same reason there's no "tenth" or "twenty-fifth," so buyers won't need to pay invoices according to the seller's terms.

THE BIGGEST, NEWEST IDEA IN WORK GLOVES!

NORTH · PVC GLOVES

...job-proved for extra safety, extra wear

Check these advantages . . .

- **Extremely tough**—Last two to five times longer than ordinary work gloves
- **Very flexible**—Give greater dexterity than any other coated gloves
- **Highly resistant**—Nonflammable, non-oxidizing and resistant to practically all chemicals—will not crack or peel

Give your employees the maximum protection afforded by North PVC Gloves. There's a size to fit every hand comfortably, reducing fatigue and increasing efficiency. As a result, your production will go up, your accident rate will go down. Available in knit-wrist, band top and gauntlet types—palm and partial back coated styles.

FREE OFFER—On your business letterhead, kindly furnish us complete details of your working conditions—and we will send you a sample pair.

1600 SERIES. Fully coated, heavy duty.

1800 SERIES. North-Grip—Permruff surface; for handling slippery surfaces.

We also make a complete line of North PVC chemical and foul weather protective garments and the famous Jomac loop-pile industrial gloves, handguards and safety sleeves for up-to-shoulder protection.

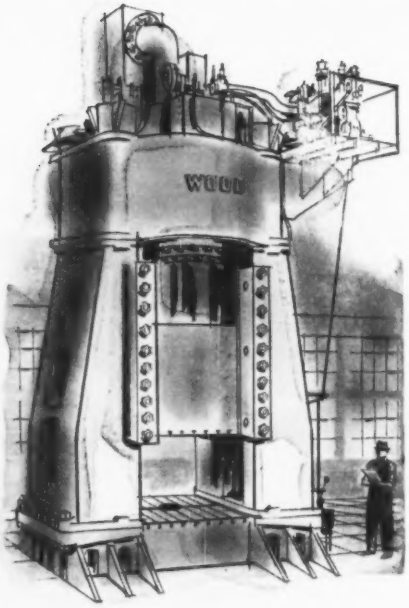
JOMAC Inc.

Dept. K, Philadelphia 38, Pa.

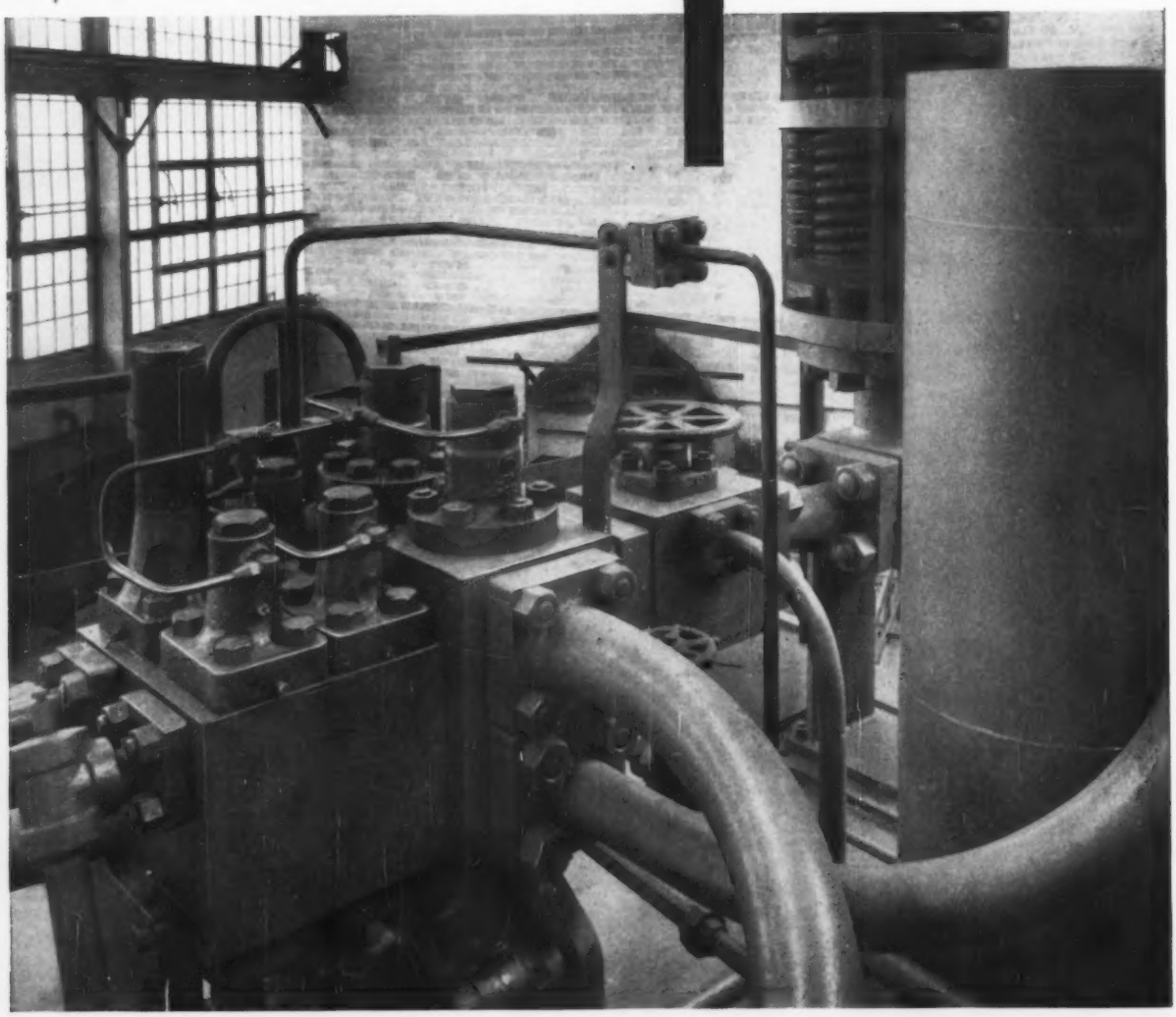
Associated companies and distributors throughout the world

Treat 'em rough,
These Wood Valves can take it.

Presses take a beating? No need to worry about the effect on your hydraulic system if Wood Valves are at work. They're built to handle the toughest jobs. For example, this 3"x1½" special main control valve is installed on a 1500 ton forging press. Operating conditions demand extremes in acceleration and deceleration, yet the valve assures shock-free, efficient service due to its inverse flow design. Control of the ram is precise, accurate . . . with shockless decompression. You can also see a fully balanced throttle valve and a 3"x7" shock alleviator, further examples of Wood's complete line of quality high-pressure valves. Write today for complete information.



R. D. WOOD COMPANY
PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA



COMING EXHIBITS

Western Metal Show — March 16-20, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

Corrosion Show — March 16-20, Chicago. (National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Texas.)

1959 Nuclear Congress—Apr. 5-9, Cleveland Auditorium, Cleveland. (Engineers Joint Council, 29 W. 39th St., New York 18.)

Welding Show—Apr. 6-10, International Amphitheatre, Chicago. (American Welding Society, 33 W. 39th St., New York.)

Engineered Castings Show — Apr. 13-17, Sherman and Morrison Hotels, Chicago. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Packaging Exposition—Apr. 13-17, International Amphitheatre, Chicago. (American Management Assn., 1515 Broadway, N. Y.)

Powder Metallurgy Show — Apr. 20-22, Sheraton - Cadillac Hotel, Detroit. (Metal Powder Industries Federation, 130 W. 42nd St., New York 36.)

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Material Handling Show — June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

MEETINGS

MARCH

Steel Founders' Society of America —Annual meeting, Mar. 9-10, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

(Continued on P. 18)

Users of **GEARS** gain these benefits FROM **FAIRFIELD**

1. **MASS PRODUCTION ECONOMY** — Large or small, you get the benefits of high production rates and big volume output at Fairfield—where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!
2. **QUALITY PLUS**—There is no finer recommendation for the quality of the product you sell than to be able to say it is "EQUIPPED WITH FAIRFIELD GEARS!"
3. **DEPENDABLE SOURCE OF SUPPLY** — Supplier of precision-made, automotive type gears for more than thirty-five years to leading builders of construction, agricultural, industrial, marine, and automotive equipment.
4. **COMPLETE PRODUCTION FACILITIES**—Unexcelled facilities in an ultramodern plant for producing Spur, Herringbone, Spiral Bevel, Straight Bevel, Hypoid, Zerol, Worms and Worm Gears, Splined Shafts, and Differentials to your specifications.
5. **ENGINEERING SERVICE**—Fairfield engineers are qualified to make expert recommendations on your gear production requirements. *Send for interesting, illustrated bulletin describing Fairfield's facilities.*

FAIRFIELD
MANUFACTURING CO.

2319 S. Concord Rd.
Lafayette, Indiana

WHY is chaser hardening important to your threads?

When cutting your threads—long tool life, maximum accuracy, and trouble-free operation can only be assured by proper chaser hardening.

Proper chaser-hardening technique is an important intangible offered you by LANDIS Threading Specialists. For example, LANDIS Tangential Chasers are often given special hardening treatment when workpiece design or material specifications so indicate. Just as with the blacksmith of years gone by, so chaser hardening today is an art. The ability to determine and apply the proper chaser-hardening technique is the result of more than 50 years experience in a single field—THREADING.

Yet—chaser hardening is but one benefit of the extensive technical knowledge and practical experience accumulated through years of specialization. Recommendation on unusual tooling set-ups, automation, new methods, the most efficient type of threading equipment are a few of the many ways in which LANDIS Threading Specialists may be of help.

Whatever your need for generating threads —Cutting, Rolling, Grinding, or Tapping— LANDIS Threading Equipment will accomplish it most efficiently and economically.

When asking about threading information please send specifications.

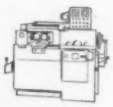
Threading Machines

LANDIS *Machine* COMPANY

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

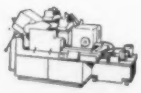
WAYNESBORO, PENNSYLVANIA

Die Heads— Rotary & Stationary



Thread Rolling Machines

Thread Rolling Tools



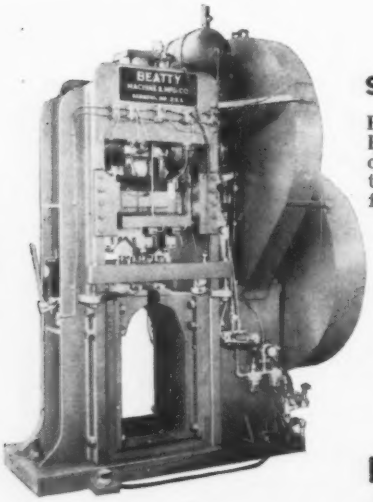
Centerless Thread Grinding Machines

Taps—Collapsible & Solid Adjustable

535C

BEATTY EQUIPMENT IN YOUR SHOP MAKES HIS JOB EASIER, TOO!

On the job, erecting the structural steel which you fabricate, the precision, speed and accuracy of Beatty Machines pays off big for your customers, too! That's because Beatty equipment is engineered for maximum accuracy and speed in heavy metal-working — punching, slotting, bending, flanging, forming. Beatty machines help you deliver the goods on time, speed fabrication by reducing set-up time and material handling. The new Beatty No. 7 Detail Flange Punch, for example, flange-punches I-beams in only two passes where ordinary equipment requires four passes. Look to Beatty for heavy metal-working equipment — a complete line of punches, presses, shears, bulldozers.



SPECIFICATIONS

BEATTY NO. 7 DETAIL FLANGE PUNCH — 100-ton cap., mechanically driven guillotine-type. Punches 1¼" hole through 1" mild steel and handles beams from 6" to 36".

Write For Full Details

BEATTY MACHINE & MFG. CO.
936 150th St., Hammond, Ind.

EXHIBITS, MEETINGS

(Continued from P. 15)

International Acetylene Assn.—Annual convention, Mar. 9-10, Hotel Roosevelt, New Orleans, La. Association headquarters, 30 E. 42nd St., New York 17.

Fire Equipment Manufacturers Assn., Inc.—Annual meeting, Mar. 11-12, Barbizon-Plaza Hotel, New York. Association headquarters, 759, One Gateway Center, Pittsburgh.

Pressed Metal Institute — Annual spring technical meeting, Mar. 11-13, Pick-Congress Hotel, Chicago. Institute headquarters, 3673 Lee Rd., Cleveland 20.

American Institute of Chemical Engineers—National meeting, Mar. 15-19 Haddon Hall, Atlantic City, N. J. Institute headquarters, 25 W. 45th St., New York 36.

Society of Automotive Engineers—National passenger car, body and materials meeting, Mar. 16-18, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 485 Lexington Ave., New York 17.

Society for Non-destructive Testing, Inc.—Western regional convention, Mar. 16-20, Ambassador Hotel, Los Angeles. Society headquarters, 1109 Hinman St., Evanston, Ill.

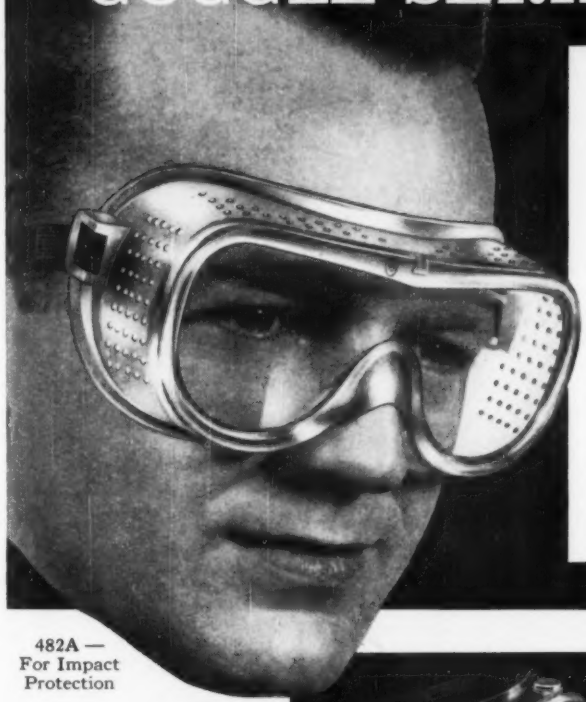
Investment Casting Institute—Meeting, Mar. 17-19, The Surf Rider, Santa Monica, Calif. Institute headquarters, 27 E. Monroe St., Chicago.

American Machine Tool Distributors' Assn.—Spring meeting, Mar. 17-19, The Sheraton-Park Hotel, Washington, D. C. Association headquarters, 1900 Arch St., Philadelphia.

Electronics Industries Assn.—Quarterly meeting, Mar. 18-20, Statler Hotel, Washington, D. C. Association headquarters, 1721 DeSales St., N. W., Washington.

Give your men the Protection and Comfort of AO's NEW FLEXIBLE MASK GOGGLE SERIES

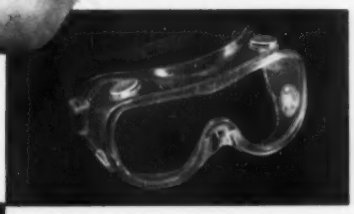
Eye Protection



Here's a great new *series* of light, comfortable, flexible mask goggles which retain the comfort of the previous series — with a smoother face — hugging fit at the nose and temples! Particularly noteworthy is the LARGER, MUCH DEEPER MASK — affords greater protected area and fits easily over Rx and personal glasses. Lens is interchangeable, one-piece acetate curved slightly for wider vision. Headband is easily adjustable elastic.

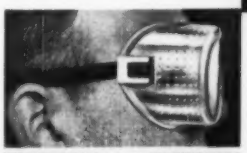
482A — clear frame, clear or green lens. (483A with green frame). For protection against flying particles in babbitting, chipping, cutting rivets, light grinding, hand or machine tool work or where spark-explosion hazards exist. Note ample perforations for ventilation.

482A — For Impact Protection



484A — For Chemical Splash Protection

484A — Basic structure similar to the 482A but with four ports (instead of perforations). Provides safe indirect ventilation and anti-fogging while protecting against chemical splashes. Resistant to acids and alkalies. Clear frame, clear or green lens. (485A with green frame).



Deeper cup — increased lateral protection. Easily fits over safety Rx and personal glasses.

Modified nosepiece. Aids comfort and fit.

486A — For protection against dangerous light rays, glare, flying sparks and scale in acetylene welding, cutting, burning, brazing and furnace work. Has black lens adapter which takes the standard AO lens and regular 50mm. round filter lenses and cover lenses. Goggle has Noviweld filter lenses, shades 3, 4, 5, 6. For chipping and grinding, companion Model 489A comes with clear frame, clear transparent adapter and Super-Armorplate lenses.

487A — Similar to our 483A except for *transparent* green frame. For maintenance men, truck drivers and factory workers where glare from overhead lighting is a problem and where impact protection is needed.

Always Insist on the AO Trademark on Lenses and Frames

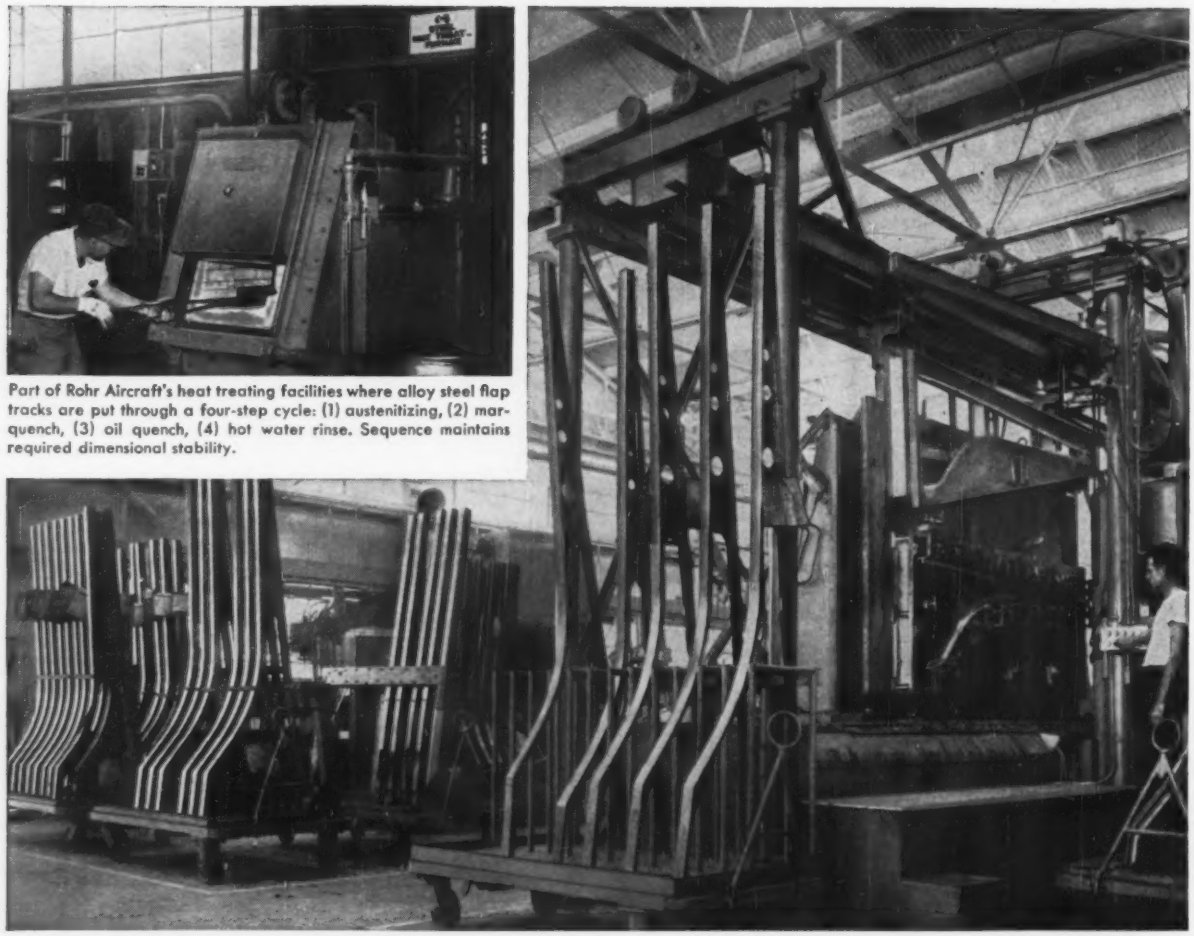
American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS
Safety Service Centers in Principal Cities

Problem-Solving Products from Republic

Increase Strength/Weight Ratios, Cut Costs, Save Weight, Maintain Dimensional Stability

Part of Rohr Aircraft's heat treating facilities where alloy steel flap tracks are put through a four-step cycle: (1) austenitizing, (2) marquench, (3) oil quench, (4) hot water rinse. Sequence maintains required dimensional stability.



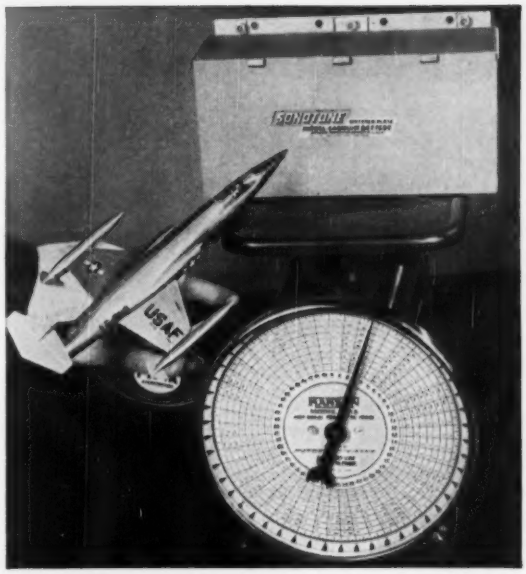
ALLOY STEEL MEETS HIGH STRENGTH, PRECISION REQUIREMENTS IN USAF BOMBERS. Steel weldments produced by Rohr Aircraft Corporation, Chula Vista, California, are an excellent example of the aircraft industry's constant effort to develop better and more economical methods of mass-producing large, high-strength structural aircraft components.

Rohr is currently using this weldment technique in manufacturing flap tracks for an Air Force bomber. The flap tracks are fabricated from AMS 6428 Alloy Steel, a type supplied by Republic. This fine steel provides a minimum tensile strength of 180,000 psi in the heat treated condition. Uniform response to heat treatment assures exceptionally good deep hardening characteristics—plus hard, wear-resistant surfaces.

The exceptionally high strength-to-weight ratio of Republic Alloy Steel combined with the highest strength values permits the design of thinner, lighter track sections to save weight and hold down size without sacrifice of strength or safety.

Rohr's development of specialized tooling, welding, and heat treating techniques permits the production of these alloy steel weldments to close tolerances—a rigid aircraft engineering requirement. Costs are reduced by eliminating the need for expensive equipment and excess stock removal.

Specify Republic Alloy Steel for your parts that must be tough, strong, dependable. Our metallurgists are always available to help you in selection and processing. The coupon is your invitation to use this obligation-free service.



REPUBLIC STAINLESS STEEL, Type 302, cuts costs, saves weight, resists corrosion in jet aircraft storage battery cases made by Sonotone Corporation, Elmsford, New York. Stainless steel's exceptionally high strength-to-weight ratio and ability to withstand impact and vibration permits the use of a lighter gage, thus saving weight. Sonotone reports the metal's outstanding corrosion-resistance eliminates the need for painting the cases with no detrimental effect on service or appearance. Republic Stainless Steel also resists the wide extremes of temperature and atmosphere through which the batteries must operate. Mail the coupon for more facts on Republic ENDURO® Stainless Steel.

REPUBLIC'S NEW HIGH STRENGTH POWDER, TYPE H.S. 6460, opens the way for sinterings for highly stressed parts in aircraft and missiles. Type H.S. 6460 can be used with existing operating equipment. It provides a minimum tensile strength of 60,000 psi at 6.4 density as sintered, and 100,000 psi heat treated. Type H.S. 6460 maintains its dimensional characteristics after sintering—less than .004 inches per inch shrinkage from die size at 6.4 density. Available in production quantities up to and including 12 tons, or multiples thereof. Mail coupon for technical data sheet on Type H.S. 6460 Powder.

REPUBLIC TITANIUM ALLOYS are used for weight saving and elevated temperature applications in the B-58 Hustler. The supersonic bomber is built for the Air Force by Convair, a division of General Dynamics Corporation, Fort Worth, Texas. These particular titanium alloys have minimum tensile strength of 130,000 psi and a minimum yield strength of 120,000 psi. Among the strongest alloys now being produced, they meet the demand for high strength to resist the effects of aerodynamic heating in supersonic aircraft, such as the B-58. Republic metallurgists and engineers, pioneers in the development of high strength-to-weight metals, are ready to help you apply titanium to your product or process.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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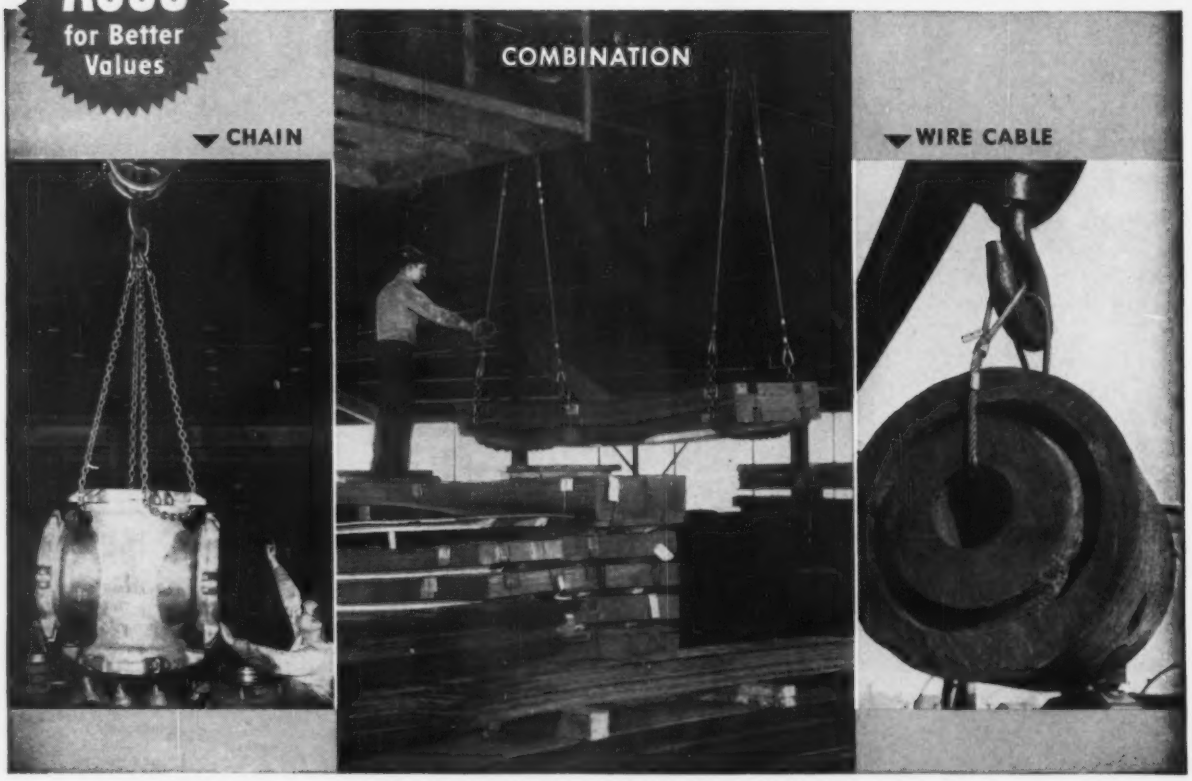
Have a metallurgist call.
☐ Alloy ☐ Stainless Steel
☐ Metal Powder ☐ Titanium

Send more information on these Republic products:
☐ Alloy Steel ☐ Stainless Steel
☐ Type H.S. 6460 Powder ☐ Titanium

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

ACCO for Better Values

Acco Registered® Slings—Chain and Cable



ACCO—*your first source for any sling for any job*

Whatever your sling requirements, there's an ACCO *Registered* Sling to do your particular lifting job in the safest, most economical way possible. Your rigger knows why certain slings should be used to lift certain types of loads, depending on varying factors of shape, weight, material and finish. Sometimes chain slings are necessary; other times cable; and on certain lifts a combination of chain and cable slings are best.

Because sling work requirements do vary from job to job, make certain that all your slings are precision-made under uniform conditions of quality control and pre-tested before they leave the factory. Only ACCO *Registered* Slings can give you this assurance...in the widest range of sizes and styles from any single source.

In addition, you get the latest technical improvements in ACCO *Registered* Slings. For example, there's the new shaped Master Link now available without extra charge on all ACCO *Registered* Slings. This new link, an exclusive development of ACCO engineers, gives 18% greater resistance to distortion with no increase in weight. Just one more quality bonus you get from ACCO *Registered* Slings.

Each of these slings is factory proof-tested at a load of no less than twice its rated capacity. Only after a sling has passed this rigorous test is it given the ACCO tag and certificate of registration.

Tell your distributor you prefer ACCO *Registered* Slings.

WHAT "ACCO REGISTERED" MEANS

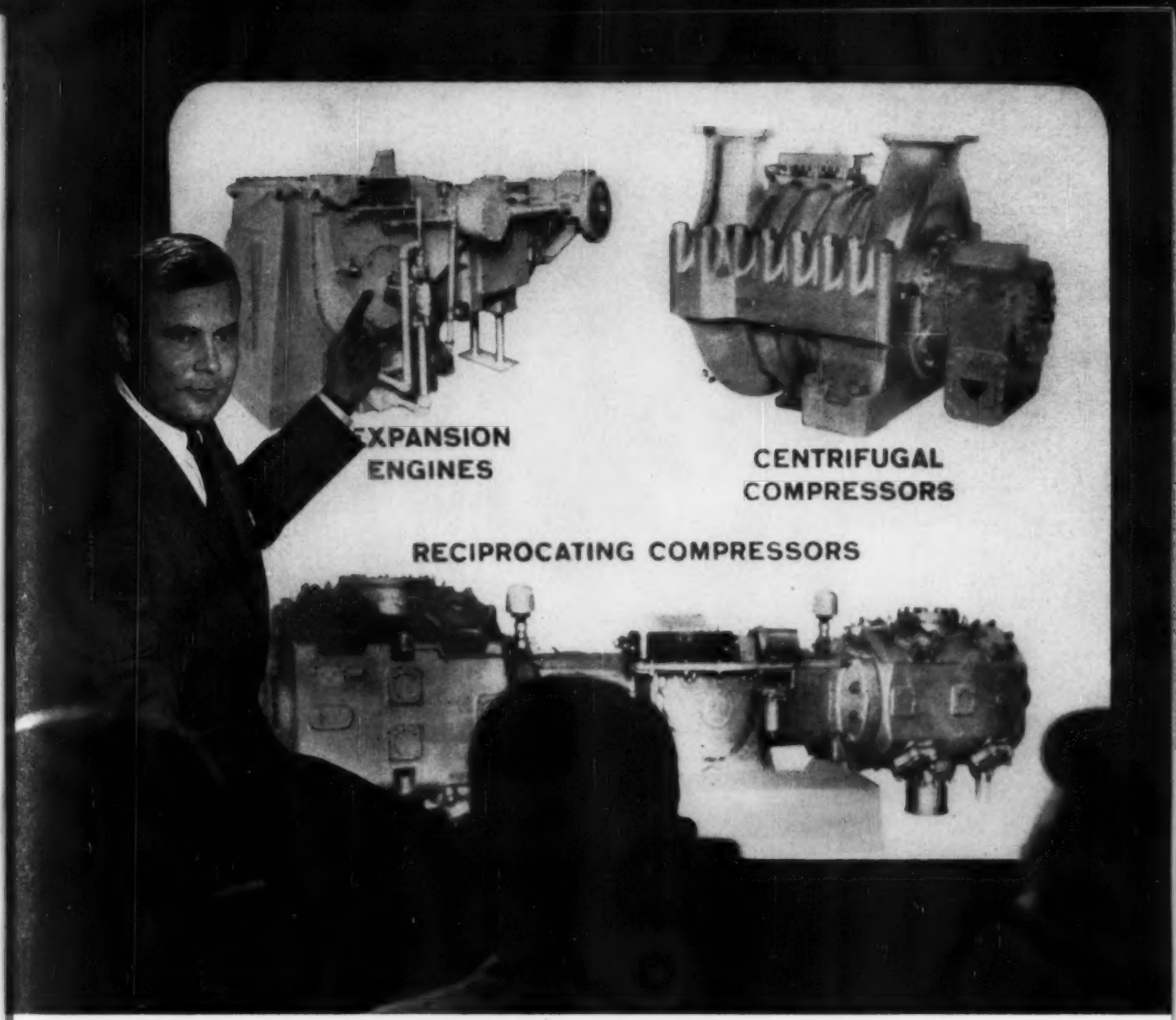
1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring or tag on each sling
6. Signed Registry Certificate with each sling

AMERICAN CHAIN & CABLE
BRIDGEPORT, CONN.

ACCO

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

TRADE MARK



George Edick, *Sales Manager Domestic Division, The Cooper-Bessemer Corporation, displays three types of units for oxygen production and explains...*

How Cooper-Bessemer can help you plan oxygen facilities to improve steel-making

It will pay you to check Cooper-Bessemer when you start to plan oxygen facilities for steel production because:

Unbiased analysis. Since we offer all types and sizes of compressors and expansion engines, we can apply the units best suited to your specific needs.

Integrated installation. We can provide complete engineering service for the entire power-compression-expansion operation, including En-Tronic controls for most economical operation.

Unmatched service. Our outstanding field service and warehouse facilities nearby assure prompt attention to your operating needs... at start-up time and for the years to come.

Call our nearest office for further details.

BRANCH OFFICES: Grove City • New York • Chicago • Washington San Francisco • Los Angeles • Houston • Dallas • Odessa • Pampa Greggton • Seattle • Tulsa • St. Louis • Kansas City • Minneapolis New Orleans • Shreveport • Casper • Gloucester

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C-B Southern, Inc.... Houston

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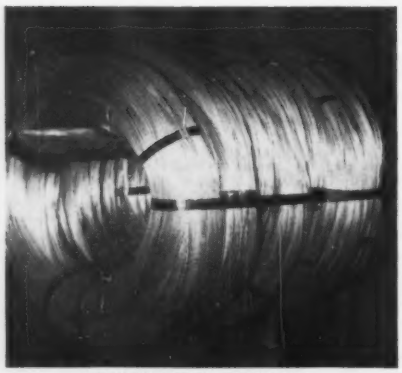
GENERAL OFFICES: MOUNT VERNON, OHIO

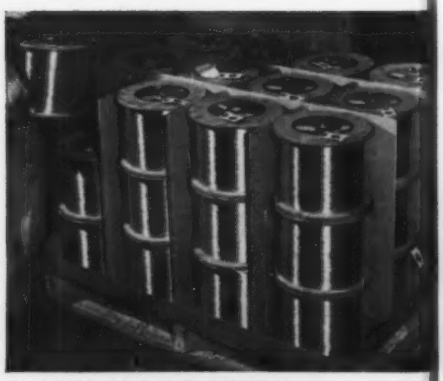
ENGINES: GAS · DIESEL · GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL, ENGINE OR MOTOR DRIVEN

Other new AS&W Wire Packages mean important savings in



UNITIZED COILS:
Several regular mill coils bound in one unit to speed up handling and save storage space. Unitized coils carry no price extra!

PAY-OFF DRUMS:
Large, fibre, disposable carton containing long continuous wire coil. Pay-Off Drum is easy to handle and stack, protects wire finish from dirt and corrosive atmospheres.



DISPOSABLE SPOOLS:
Contain up to 65 pounds of fine wire; are shipped on expendable pallets. These non-returnable spools are convenient to handle and stack.

WEIGHT WIRE COILS

save you down time...

handling time...storage space

...at no increase in cost!

If your mill machines are set up to run with these continuous-wire, heavy-duty coils, they will pay off for you in three ways:

They will speed up your production by eliminating unnecessary down time, unnecessary idling of operators and machines.

They will save handling time. One large coil can be handled in a fraction of the time needed to move the same weight in smaller coils.

They save storage space. This big coil takes up far less space than the same weight in smaller coils.

And you get all these advantages as standard mill practice. *USS and American are registered trademarks*

American Manufacturers Wire

time and storage!

PLATFORM COIL CARRIER: This non-returnable unit is made of U-shaped wire frame attached to deck platform, holds up to 3,000 pounds of wire in continuous lengths.

All of these new American Steel & Wire Packages are planned to serve you better, to help you use warehouse space to better advantage, to save time and money.

For more information, get in touch with the nearest district office of American Steel & Wire. General Offices: American Steel & Wire, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

American Steel & Wire
Division of
United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

The Aluminum Man*...
*Twenty-six years a communicator of new progress in metal, William F. Gilligan—salesman for Alcoa distributor Whitehead Metals, Inc., of New York City—is typical of the men who make their careers service to industry, through knowledge of aluminum!

He helps triple screw machine parts output

Automatic screw machines can work production miracles. But *full* realization of their potential depends upon the *material* they machine. And it is here that *The Aluminum Man*—your Alcoa distributor salesman—offers real help, two ways.

First, his lightweight . . . high-strength . . . corrosion-resistant Alcoa® Aluminum Screw Machine Stock delivers *three times more parts* per pound of material than heavier metals . . . machines with unmatched ease . . . and in many instances, drastically reduces tool wear and downtime!

Second, he can help improve production for you with superior technical assistance in determining the proper alloy and production methods. That's because he draws upon the experience of the company that *pioneered* the development of aluminum for screw machine operations . . . Alcoa!

Call him on your problem. His aid and prompt delivery from nearby warehouses is yours whether you need a *few* pounds or *thousands* of pounds of aluminum . . . the light metal with the bright future that's being seen in more places . . . more and more!

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He's your Alcoa Distributor Salesman
for sheet, tube, shapes, screw machine stock
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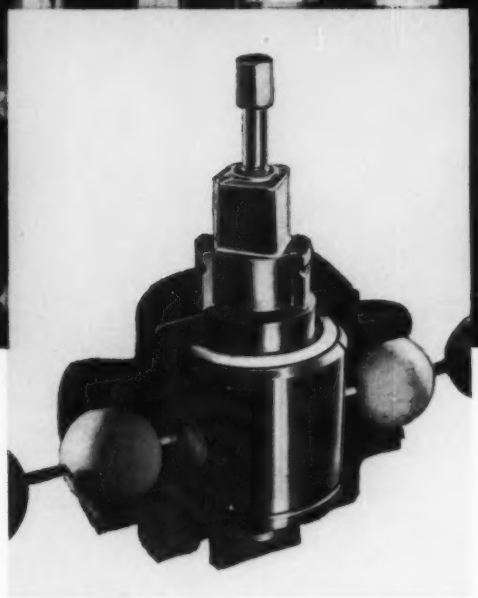

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For example: You can see excess lubricant as it escapes around the neck of the plug—no build-up of excessive lubricant pressure; no lubricant forced into the line.

For example: Special design requires a minimum amount of lubricant for servicing.

For example: The valves may be installed in any position, and they fit into the smallest possible space.

Specify ACF when your job calls for plug valves. They'll give you dependable performance, long life and economical operation.

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Lubricated Plug Valves with round port, full pipe area

This is the valve for heavy fluids and ladings. When open, the round port becomes an exact continuation of the pipe. There is no change in velocity, area, direction or cross-section of the lading. There are no pockets to trap the lading, and seating surfaces are sealed away from contact with the fluid flow.

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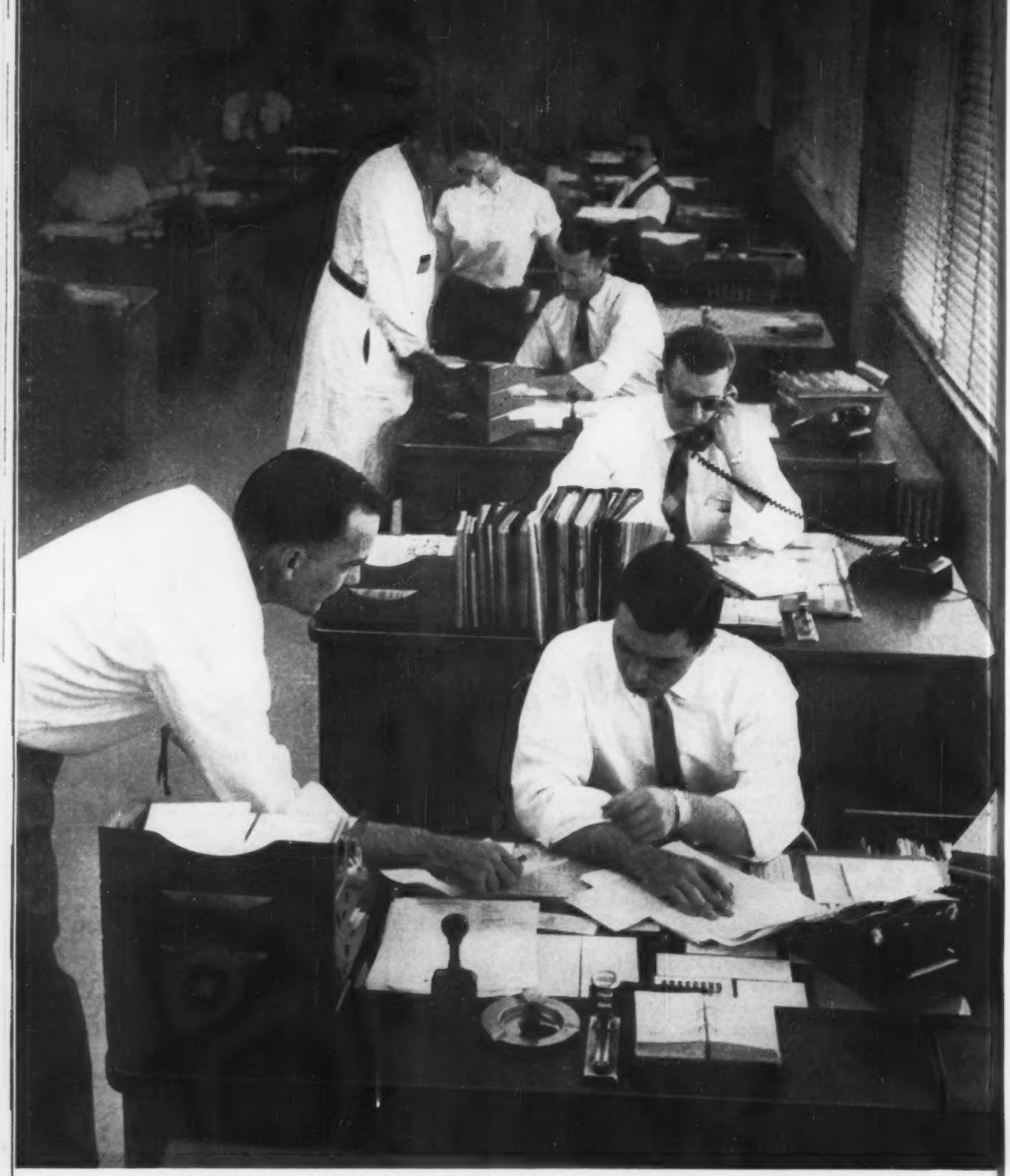
integrated CRUCIBLE steel service



Crucible inside account salesmen (1) simplify ordering and expedite deliveries of the steels you need, (2) arrange for handling extra services, (3) supply you with basic steel and metalworking data.

staffs 31 local warehouses with specialized personnel to solve your specialty steel problems

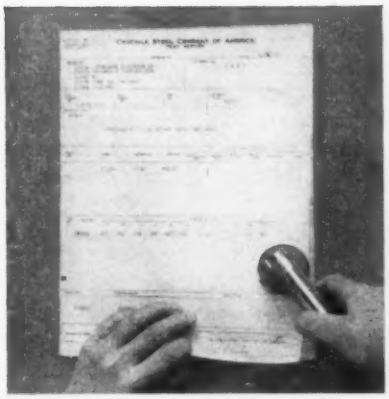
"We frequently rely on Crucible warehouse people," says one of our good customers. "We've found they can sometimes show us more economical steels, sizes and methods than those we're using. Furthermore, they give us valuable help with steels we're using for the first time."

This steel buyer, like thousands of others, believes in getting services with the steels he buys. Here's what he gets:

Crucible inside account salesmen help him simplify ordering, speed up his deliveries. They can efficiently arrange for extra services, such as forging, slitting, grinding and polishing, because of their special training at Crucible mills.

Crucible sales-service engineers give their production and toolroom people valuable metalworking assistance. They'll recommend machining speeds and feeds, quenching temperatures, the best forming and joining methods.

Behind these specialists are the resources of Crucible's entire, integrated operation – from mining the ore to steelmaking to warehouse delivery to you. Why not take advantage of these services each time you order specialty steels? They're available through every Crucible warehouse. *Crucible Steel Company of America, Dept. PC06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



Need certified test reports for government work? Warehouses can supply the steels and notarized reports of analyses.

Trained, experienced sales-service engineers can help your engineers use steels that are new to you.

This is the easiest way to arrange for forging, flame-cutting — have the warehouse accommodations service do it for you.

STOCK LIST
Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

TOOL STEELS–Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS–Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el® rounds, hexagons, plates and brake die steel
ALLOY STEELS – Bars, billets, strip and sheet
COLD ROLLED CARBON SPRING STEELS
DRILL STEELS – Hollow and solid drill steels
ALUMINUM EXTRUSION DIE STEELS
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WELDING AND HARD FACING ROD
PLASTIC MOLD STEELS
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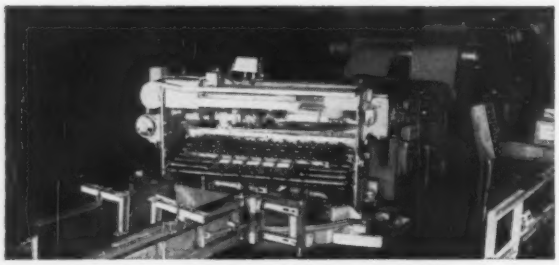
Cincinnati® Shear swivels for mitre cuts at Budd



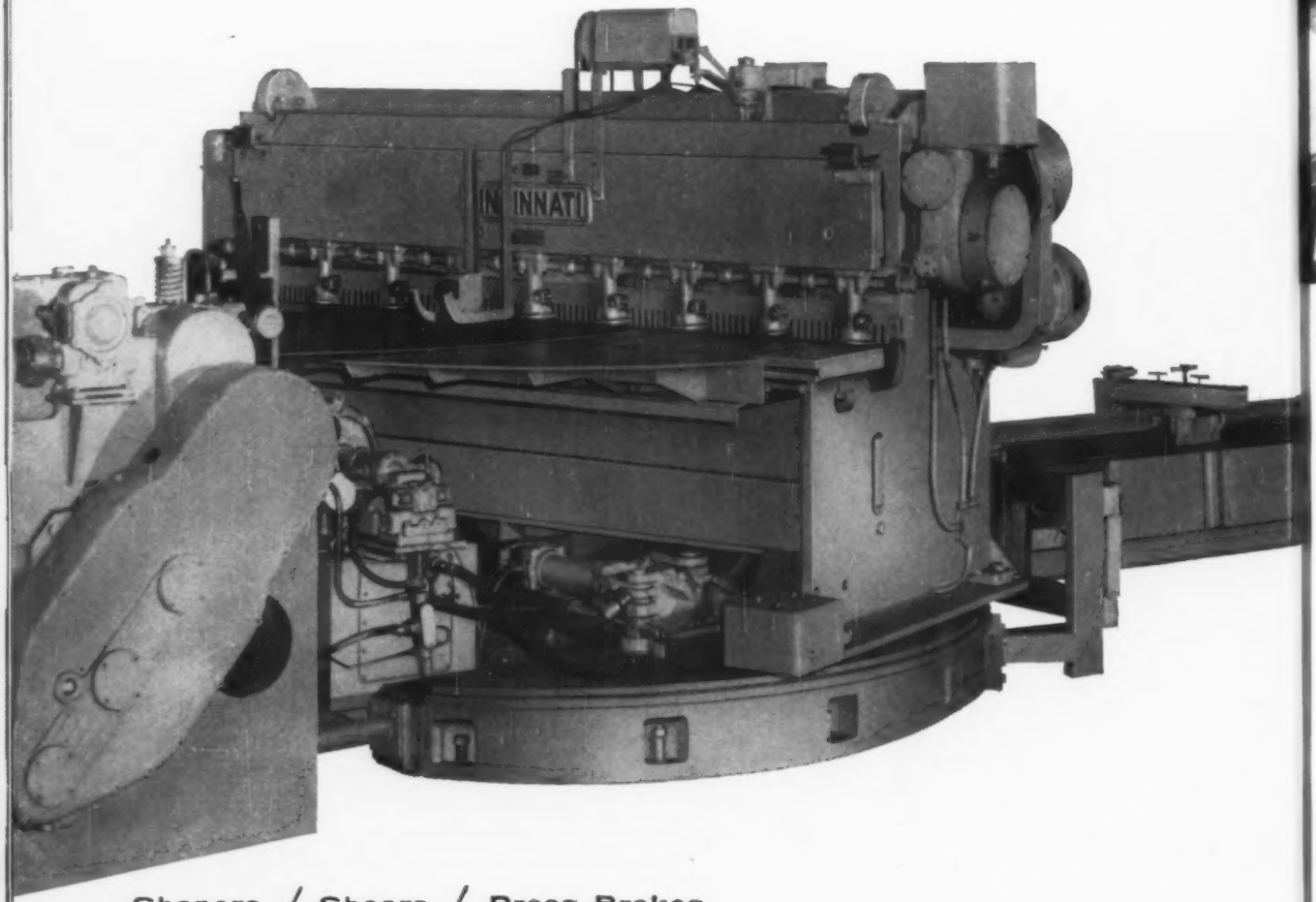
This Cincinnati® Shear is an integral part of an automatic decoil and shear line at The Budd Company's Gary, Ind., plant. It is used for straight and mitre shearing of coil stock into sheets.

Mounted on a swiveling base, the shear can be rotated 22½° to either side of center, so the operator can pre-set the desired angle of cut.

Accuracy must be within ⅛″ per 80″ of feed. Sheet widths range from 24″ to 72″ and thickness from 21 to 16 gauge (.0349″ to .0625″). Since the operation must be automatic and continuous to be economical, Cincinnati dependability is a vital asset.

This shear was specially engineered for The Budd Company. However, most of its profitable features are available with standard Cincinnati® Shears. They include powerful hydraulic hold downs, all-steel interlocked construction, and one-clearance shearing of different metal thicknesses.

Complete details on Cincinnati® All-Steel Shears are included in Catalog S-7R. Write to Dept. B.



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THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

THERE'S A VERSATILE SAGINAW SCREW TO SOLVE EVERY ACTUATION PROBLEM

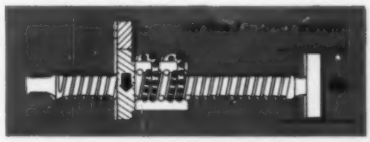
ACTUATES and POSITIONS WITH OVER 90% EFFICIENCY

- **POSITIONS MORE PRECISELY** than acme screws, hydraulics or pneumatics. Can be held within .0005 in./ft. of travel.
- **SAVES POWER** with over 90% efficiency. Permits much smaller motors, far less power drain, simplifies circuitry.
- **SAVES SPACE/WEIGHT** because Saginaw b/b Screws are compact. Allows smaller, lighter motors, gear boxes. Eliminates cumbersome auxiliary equipment.
- **DEPENDABLE PERFORMANCE.** Saginaw Screws are far more reliable than hydraulics. Gothic-arch grooves, yoke deflectors, multiple circuits increase assurance.
- **TEMPERATURE TOLERANCE.** Normal operating range is from —75°F. to +275°F. With selected materials, up to +900°F.
- **LUBRICATION LATITUDE.** If lube fails, the Saginaw b/b Screw still functions with remarkable efficiency.

The men who want to exact the maximum potential from their products specify the remarkable Saginaw Screw! The unequalled efficiency and precision of the Saginaw b/b Screw goes a long way to eliminate design and production problems. It actuates your product (large or small) more smoothly, simply, surely, and very often more cheaply than other methods. For full details, write or phone today for your free 1959 engineering data book on Saginaw b/b Screws and Splines.

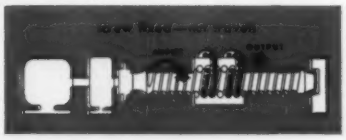
A FEW TYPICAL USES OF SAGINAW SCREWS:

- Airplane & Missile Components
- Photography Equipment
- Bumper Jacks and Lift Trucks
- Convertible Top Lifts
- Automatic Garage Doors
- Circuit Breakers
- Die Table Positioners
- Farm Equipment and many, many other applications



SCREW TRAVELS: When rotary motion is applied to the b/b nut, the screw glides along its longitudinal axis on rolling steel balls, converting rotary force and motion to linear force and motion with unprecedented efficiency.

NUT TRAVELS: When rotary motion is applied to the screw, the b/b nut glides along the axis of the screw on rolling steel balls, converting rotary force and motion to linear force and motion with *4/5 less* torque than acme screws.



WORLD'S MOST EFFICIENT ACTUATION DEVICE

Saginaw ball bearing Screw

SAGINAW STEERING GEAR DIVISION OF GENERAL MOTORS • SAGINAW, MICHIGAN

WORLD'S LARGEST PRODUCER OF BALL BEARING SCREWS AND SPLINES

Unless you buy leaded steels directly from Inland's Indiana Harbor Works, chances are you've never seen this tag. But among Cold Drawers and Steel Warehouse men who process and sell leaded steels in a variety of forms to manufacturers, it is famous.

Every one of them recognize that behind this tag lies years of research, development and *unequaled experience*. Twenty years ago it marked the world's first commercial leaded steel. Today this tag represents the standard of performance by which all other free-machining steels are compared. It signifies LEDLOY* . . . the most machinable leaded steels obtainable.

INLAND STEEL CO., 30 West Monroe Street, Chicago 3, Illinois.

Get Inland Ledloy *steels in cold drawn form, sometimes sold under different trade names, from leading cold drawers and Steel Service Centers from coast to coast.*

AMERICAN STEEL WAREHOUSE ASS'N

*Reg. Trade Mark

This is

INLAND

LEDLOY®

WORLD'S MOST MACHINABLE STEEL

INLAND STEEL COMPANY

GALVANIZED SHEET IS MAKING HEADWAY in Detroit. The new light cars with unitized body construction are using sizable tonnages of galvanized sheet. And galvanized producers believe this construction principle will become standard on all autos.

SHOWCASE FOR NEW PRODUCTS: Westinghouse Electric Corp. arranges displays of new products made by its suppliers. Idea is to keep Westinghouse design engineers up-to-date on new developments.

INDUSTRIAL FURNACE ORDERS in January ran 19 pct ahead of the same month in 1958. Industrial Heating Equipment Assn. reports new orders were about $3.5 million compared with $3 million in '58.

U. S. PORT AUTHORITIES are going right into the European Common Market to sell their harbor facilities. The Port of New York already has sales offices overseas. Now Baltimore is set to open a branch office in Brussels.

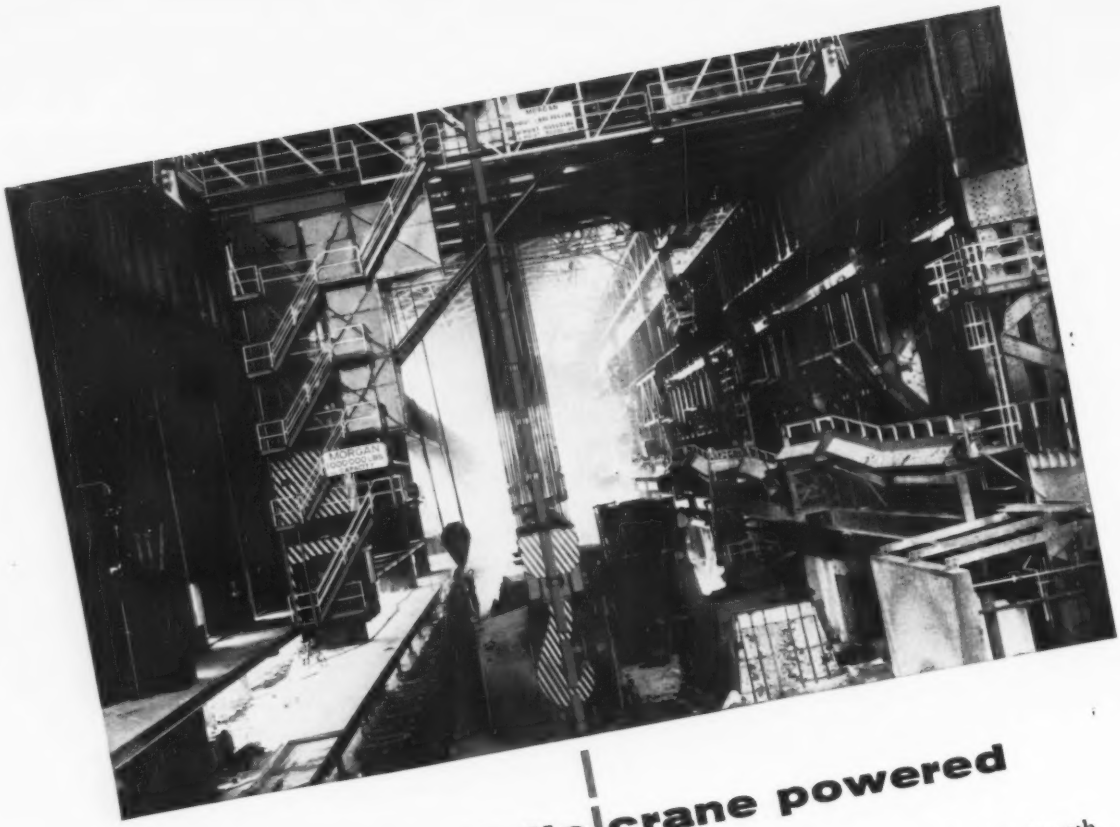
BUSINESSMEN ARE OPTIMISTIC about their second quarter sales and profits prospects. According to a survey by Dun & Bradstreet, more than three-fourths of business people believe sales will be higher than a year ago.

RESIDENTIAL BUILDING is sweetening the outlook for construction. F. W. Dodge reports that contracts for future construction are running 12 pct ahead of a year ago. And residential building is primarily responsible.

PLASTIC PROTECTION FOR ALUMINUM INGOTS? An Eastern smelter is experimenting with sprayed plastic coatings and plastic bags to protect aluminum ingots against oxidation and moisture absorption. Excessive moisture means trouble during remelting.

CONTAINER AND PACKAGING INDUSTRIES look for a record year in '59. Business and Defense Services Administration report: Metal cans expect to be up 2 to 5 pct over '58; glass containers, 5 pct; folding paper boxes and corrugated shipping containers, also up. Aluminum foil packaging is expected to hit a record of 200 million pounds.

NEW PRODUCT DEVELOPMENT can be a slow process. On the average, it takes about three years to bring a new product idea out of the lab and into the sales department. Add another six months of field testing before even limited sales begin. These estimates came out during a recent American Management Assn. seminar in Chicago.



Morgan 500-ton ladle crane powered by Cleveland drives

In an Eastern steel producer's open-hearth department, this giant 500-ton hot metal ladle crane substantially speeds up furnace-to-mold time on their ingot casting flow.

It features two custom-built Cleveland worm and gear sets transmitting 360 horsepower each for driving the hoist gear train on the 500-ton large trolley—providing uniform hoisting speed and power at all times.

Clevelands are designed and built to meet any requirement, wherever a powerful right-angle drive is preferred. Get the latest facts on the "Cleveland Story". Write us for your free copy of Bulletin 145. The Cleveland Worm & Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

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Are Steel Mills Set for Another Capital Spending Spree?

Predictions that steelmakers will spend $1 billion on capital improvements this year may be conservative.

Enthusiasm for new equipment is moving upward with the ingot rate.—By G. J. McManus.

▪ It hasn't happened yet but steel mills are taking positions for what may be the greatest capital spending spree in their history.

The mills are hitting equipment builders with a record volume of inquiries on new projects. They are boosting appropriations for capital buying. They are lining up engineering time in advance of orders.

National's Action—Actual commitments are still lagging but there are signs the rush may be starting. Two weeks ago National Steel announced a $300 million program covering a new finishing mill at Chicago and added capacity at Great Lakes Steel Corp.

Last week U. S. Steel contracted for another sintering line and finishing equipment at Fairless Works. One mill recently took a 30-day option on the engineering time of a builder.

Builders Confident — "Within three or four months all the shops in the country will be jammed again," predicts a veteran rolling mill man.

Others are optimistic but a little less bullish.

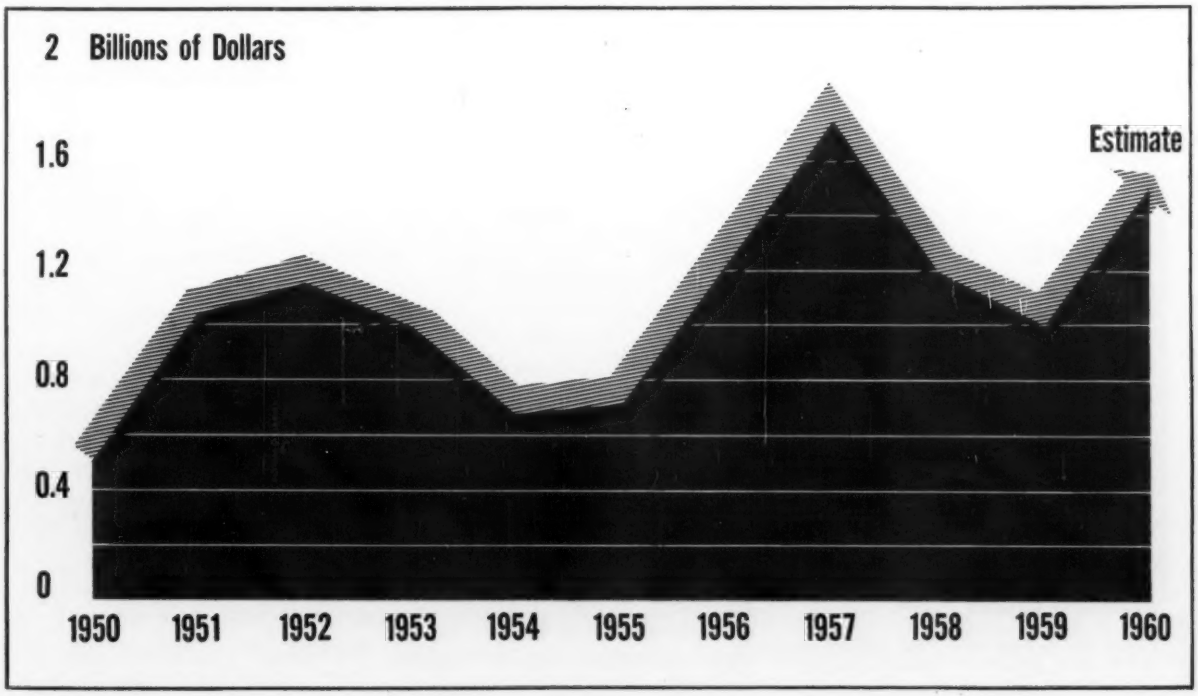
"We have passed the low point in capital spending," says G. G. Beard, president of United Engineering & Foundry Co. "I look for spending to accelerate through the second half of this year."

President Lorenz Iversen of Mesta Machine Co. refers to an "increasing number of inquiries" and expresses confidence for a satisfactory year.

Biggest factor in the revival of steel spending is the improved steel market.

Doubts Not Banished—Enthusiasm for new equipment has moved upward with ingot production. Dur-

How Much Will Steelmakers Boost Spending?



ing the first half of last year, only one new sintering line was even being talked about. During all 1958 only two lines were ordered. Today active projects approach two-digit figures.

There is still uncertainty and caution. The chance of a long steel strike must be considered. No one knows for sure how artificial the present steel boom is.

These unknowns are reflected in mill plans. Crucible Steel Co. expects to spend $10 million this year on capital improvement. That will be double last year's outlay. But Crucible says plans may be revised upward or downward depending on the course of business.

But Boom Helps—The boom has not sold itself yet but it is reviving confidence and providing dollars. With operations heading over 90 pct and orders being turned down, there is no longer much talk about overproduction and excess capacity. Capital programs are emphasizing replacement and modernization, but, as National Steel's Chicago project indicates, expansion is not ruled out.

A second big pressure for spending is technical change. The recent rate of progress has increased the penalties for inefficiency and widened the opportunities for savings. Things like basic oxygen vessels, sintering plants, and openhearth roof lances have opened an ominous gap between leading and lagging shops.

Improvement Bargains—For example, many openhearth shops are making steel at the rate of 20 tons an hour or less. A few of the big modern shops are averaging 40 and even 50 tons an hour. Oxygen vessels are making over 80 tons an hour.

At the same time many of the new developments have lightened the burden of capital improvement. Oxygen vessels cost about half as much as openhearths. Direct reduction offers promise as a pocket-size iron source. Sintering lines can be built for one-fifth the cost of a blast furnace.

As a final consideration, the mills are in a mood to jump at any development that promises cost reduction. Refractory men were amazed at the speed with which basic openhearth roofs were adopted last year. They call the current swing to basic the most abrupt change ever in refractories for steel.

Timing Important — Timing of the spending wave could be critical. Equipment shops have been living on backlogs to a large extent for the past year. Some are approaching the end of the road. "We don't know where the work is coming from after April 30," says one rolling mill man. "The next four weeks will be critical."

If builders are forced to dismantle their production organizations, chances of a jam will be that much greater. One of the reasons for past binds has been the time lag while shops regrouped their forces after a slump.

The normal pattern calls for equipment production to follow steel output and steel inquiries by 12 to 18 months. If this cycle operates, current steel prosperity will be reflected in equipment production next year. For this to happen, orders will have to start coming in soon.

Spending Estimate — According to an estimate released by American Iron and Steel Institute, capital spending in steel for 1959 will total $1 billion, or $300 million less than in 1958. Past estimates by AISI have proved extremely accurate. However, the January estimate was made before announcement of National Steel's $300 million program and before the lid blew off the steel market.

One point considered significant by equipment men: National Steel has always been known for its shrewdness in spotting capital upswings and in moving ahead of the crowd. Builders hope the Chicago project will start a trend.

Builder Problems—The benefits of timely buying are sizable. Right now the buyer can get "the best delivery in five years." Prices are reaching distress levels. In all lines, builders accuse competitors of profitless bidding, aimed only at keeping shops going.

On the question of improved steel demand, mills deny they are influenced by short-term ups and downs in their construction plans.

Mill Spending Plans

Authorized Projects

	1958	1959
U. S. Steel	$665 Million	$730 Million
Bethlehem	91.4	123
Jones & Laughlin	45.6	60
National Steel	33.7	38*
Youngstown Sheet & Tube	36.4	65-70
Inland Steel	94.3	80
Armco	61.1	45
Wheeling	16.0	25
Crucible	5.0	10
Allegheny Ludlum	4.5	7

*Does not reflect new $300 million program.

However, there was almost a complete halt to new buying during last year's slump. If current market strength persists, you can expect capital programs to be enlarged and accelerated.

All areas of steel production are being considered in current programs. Probably the biggest part of the 1959 dollar will go for finishing equipment. There will be extensive activity in the melting end but much of it will involve furnace modification or relatively lightweight equipment.

Among the various equipment lines, the future looks like this:

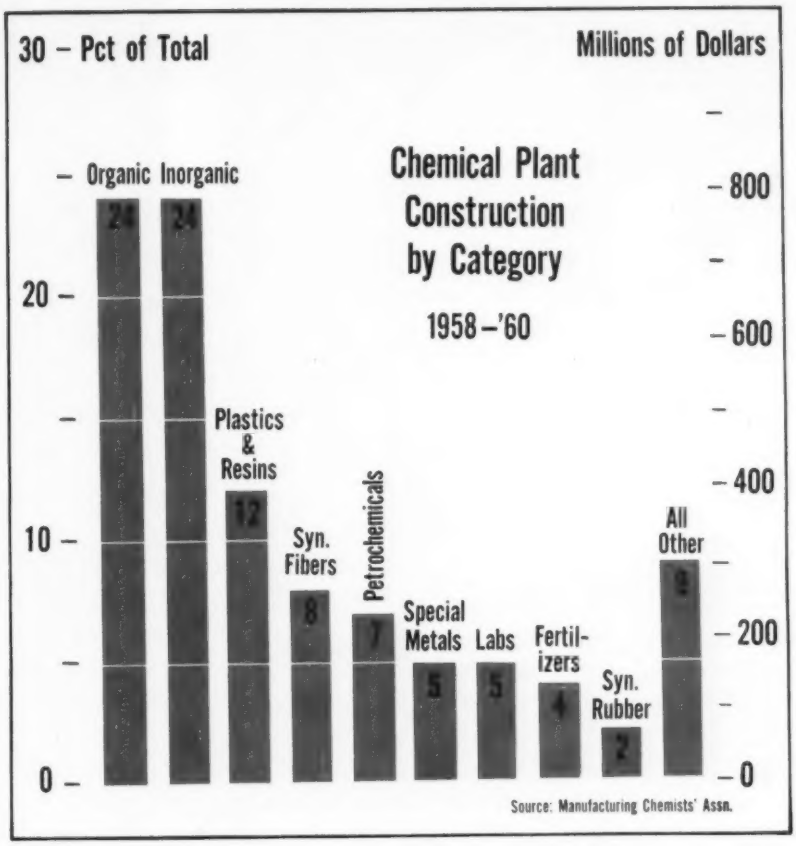
Sintering Plants — "Prospects never looked better," says a builder. "Nearly every major mill is now actively considering new sintering capacity. Sintering facilities rank with oxygen vessels at the top of spending programs."

The new wave of sintering interest began about four months ago. It came after benefits of the first big push showed up and new thinking developed on greater use of sinter.

Basic Oxygen Vessels—There is strong, widespread interest in both the LD and the Kaldo oxygen processes. One job could break within 30 days. Projects totaling over 3 million ingot tons are called imminent. A good part of the interest comes from smaller mills with high-cost facilities. Cost studies show oxygen vessels can save as much as $12 a ton and pay for themselves in one year in some installations.

Openhearth Furnaces—Over 100 openhearths have been converted or are being converted to basic construction. According to one estimate, the number could rise to more than 300 by the end of 1959.

General Furnaces—Furnace makers say they have had a few more orders and a lot more interest since the first of the year. Inquiries are coming in for electric furnaces, soaking pits, slab heating furnaces, annealing furnaces and others.



Chemical Expansion

▪ After spending a record $1.8 billion for new plant and equipment in 1958, chemical industry expansion is expected to level off during 1959-60.

The industry will spend $1.5 billion for expansion during 1959-60, the Manufacturing Chemists Assn. estimates. (See chart above.)

In its annual construction survey, MCA learned that about $1 billion will be spent for construction now in progress. Another $464 million is earmarked for planned projects scheduled for completion before 1961.

Excludes Federal Work—A total of 216 projects by 98 companies are currently underway. Construction of 88 additional projects is planned by 58 companies, with completion by the end of 1960.

Excluded from the MCA survey are costs of foreign construction, government - financed construction, office, warehouse, and other separate service facilities, and installation and modification of equipment in existing facilities.

Plastics, Metals Important—For a three-year survey period, 1958-60, the association estimates total chemical plant construction will amount to $3.3 billion. Of this total, $393 million will be spent for plastics and resins facilities and $175 million for metals.

The metals grouping is based on new production facilities for ferroalloys and other special metals refined or modified by chemical processing. These include alumina, beryllium, boron, mercury, niobium, titanium, uranium, vanadium and zirconium.

JUSTICE CLARK: "The founders did not intend to immunize such commerce from carrying its fair share of the costs of state government . . ."

JUSTICE FRANKFURTER: "The cost of such a far-flung scheme for complying . . . may well exceed the burden of the taxes themselves."

Decision Creates a Tax Mess

Supreme Court decision opens up a broad area of taxing profits on out-of-state sales.

It threatens double taxation, nuisance suits, expensive legal and accounting work. And there's no easy solution.

▪ The ruling by the U. S. Supreme Court last week that states can tax out-of-state companies on their local sales has opened up a Pandora's Box for business.

The controversial six-to-three decision affirmed this right in cases involving Minnesota and Georgia. But it will have sweeping effects in the 35 states that now tax corporate income.

The case is interpreted to cover taxes on all sales, even if the company does not actually have a sales office, warehouse, or any physical operation within the taxing state.

The Ramifications—Justice Felix Frankfurter hinted at some of the far-reaching ramifications in his dissent:

"To subject these corporations to a separate income tax in each of these states means that they will have to keep books, make returns, store records, and engage legal counsel, all to meet the divers and variegated tax laws of the 49 states . . . This will involve large increases in bookkeeping, accounting, and legal paraphernalia to meet these new demands.

"The cost of such a far-flung scheme for complying with the taxing requirements of the different states may well exceed the burden of the taxes themselves, expecially in the case of small companies doing a small volume of business in several states."

States Vary — Paying income taxes on out-of-state operations is nothing new to business—where it has a plant, with a substantial payroll and a tangible business. But even here it is troublesome, with most states having varying formulas. These are based on property, payroll, sales, or manufacturing costs in varying degrees.

But the new decision threatens to carry interstate taxation to absurd lengths.

Practice Will Spread — Furthermore, it will spread geographically. Several states have laws similar to Minnesota and Georgia, but have not pressed for compliance because of uncertain legal grounds. This uncertainty is now ended.

In addition to the primary problem of keeping the mass of records, the principal concern is double taxation. Even Justice Tom Clark conceded that in his majority opinion.

An authority on the case tells

The IRON AGE it's possible that it could result in double, triple, or even more taxation on corporate profits.

States Want Cash — It is also pointed out that states from coast to coast are revenue-hungry and will seize the new opportunity to grab off the new source of revenue. It's also expected that retaliatory measures will be imposed by other states.

What can be done? Most authorities believe there is no easy way out, but agree the first problem is to get some uniformity of law and to avoid duplication.

A company's home state usually levies its corporate income tax on the whole income. Unless some system of offset is imposed, the company can be taxed on its entire income in one state, and varying amounts on other states where it does business.

Can Congress Act — Justice Frankfurter says the problem calls for Congressional action. "Congress alone can provide for a full and thorough canvassing of the multitudinous and intricate factors which compose the problem of the taxing freedom of the states and the needed limits on such state taxing power," his opinion states.

But other legal sources believe that Congressional action would be venturing into the ticklish area of states' rights.

One large business organization has canvassed states on the possibility of limiting their action. The conclusion is that there is no possibility of uniform state action, for the simple reason that most states are desperately in need of revenue.

It's believed, however, that the subject will be brought up at the next Governor's Conference, but here again hope is dim, and for the same reason.

As Justice Frankfurter pointed out, it will be the small company that will be hurt most. Many are already getting nuisance suits, even for retroactive taxes going back some years.

World's Fair in '63?

■ Will the next world's fair be held in Washington?

Businessmen in the capital are making a determined effort to promote a world's fair there in 1963. If they succeed, it will be the first such super display in this country in a quarter-century.

Spring Showdown — First showdown will come in May, when the Washington Board of Trade asks for sanction before a 26-nation international exposition association. This association, of which the U. S. is not a member, can make or break an attempted world's fair by withholding support of its member countries for unsanctioned expositions.

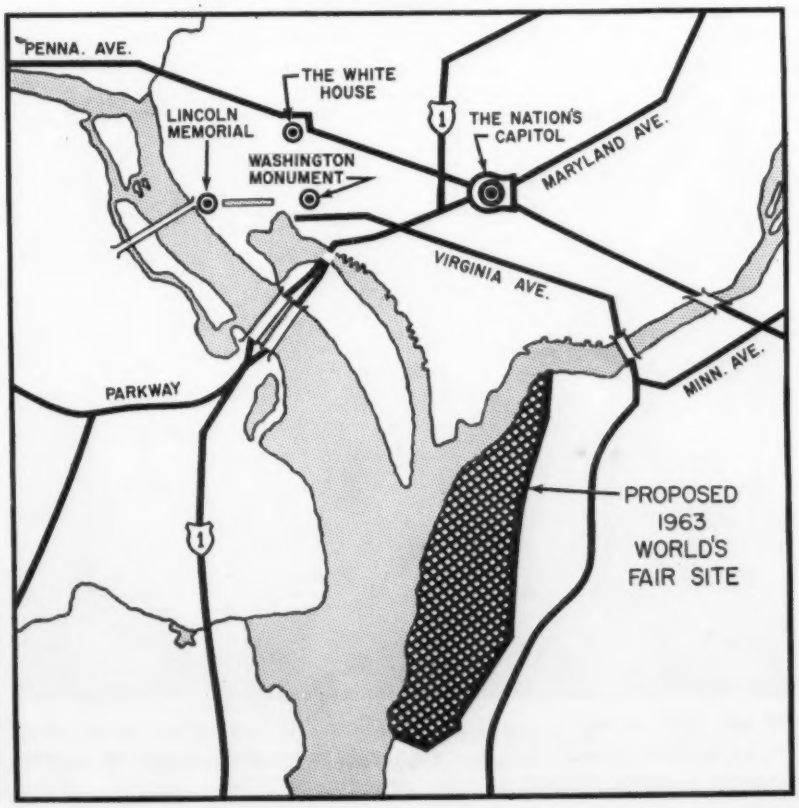
The fair would be open to industrial and business displays as well as the usual attractions and exhibits aimed at the general public.

Site Selected—Present plans call for spending $200 million or more in building on a 1000-acre tract in the southeast section of Washington which now houses the Air Force's Bolling Field and the adjoining Anacostia Naval Air Station (see map). These installations are now scheduled for relocation at a nearby Maryland Air Force station.

The fair promoters—the World's Fair Corp., consisting of members of the Board of Trade—are not yet soliciting business and industry support. They will, however, if they are successful in gaining the international association's blessing in May.

Some of the country's biggest industrial firms have already expressed interest in the project.

Where Washington, D.C. Wants Fair



It Pays to Test Before Hiring

The Government Will do It for You at no Charge

This year the government will test a record 1.5 million job applicants for industry.

Here are some of the reasons that this trend is growing.—By K. W. Bennett.

▪More companies are discovering how to cut the high cost of hiring round pegs for square slots. The answer is pre-testing.

At no cost to the employer, government agencies will select from a battery of over 300 tests to check the aptitude and ability of a job applicant for any specific position. This year the government expects to do this 1.5 million times, a new high.

Shuffle off to Profit—The government can not test workers already employed by a company. But the record of success of the system is convincing some companies to hire industrial psychologists for this. One small midwestern electrical parts maker paid a consultant $1000 to test and reshuffle a department, expects to save about $7500 by the change this year.

Here's how pre-testing has worked out for some companies:

One plant says it cut training costs by 60 pct when it began hiring only pre-tested workers. Another was able to reduce its training period from 35 to 15 weeks.

Fewer Do More—On productivity, one plant reports output up 18.5 pct when it began hiring pre-tested workers. Another found by selecting the highest scores it could get 10 girls to do the work that 14 untested girls had been doing. An electric company boosted output 11 pct with high score workers.

Another plant found that some of its people were only capable of producing at as low as 58 pct of standard. And some rated 139 pct. The average was 91 pct. The company has changed to pre-testing and expects to move its average up to 110 pct of standard.

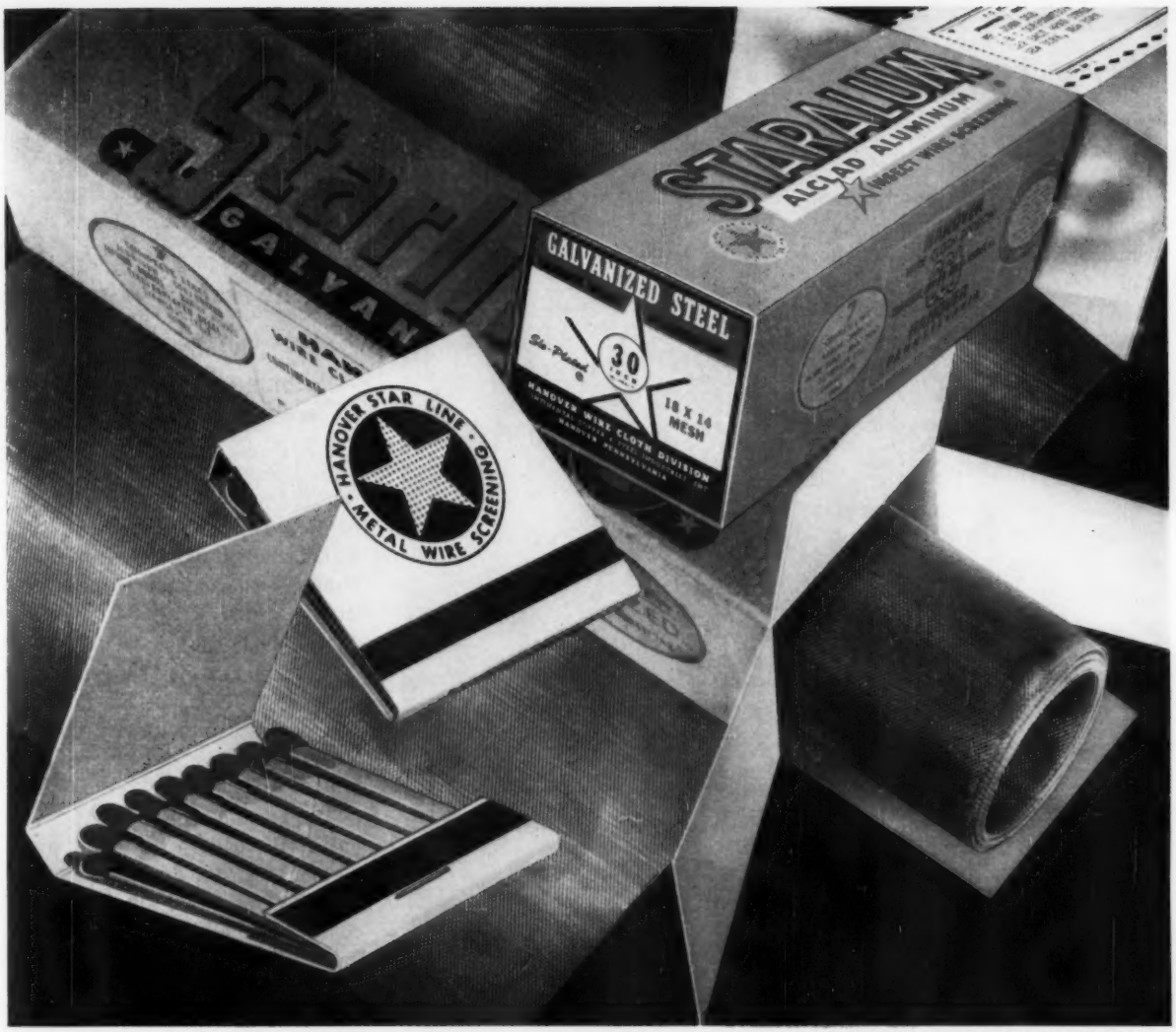
Unions For It—Union reaction? Generally favorable. Some unions even help in devising the tests. This may be because, according to some industrial psychologists, pre-testing is expanding rather than shrinking the U. S. labor pool.

Workers in the 35-44 age group are the best producers. Yet testing indicates 40 pct of workers over 45 years of age can out-produce the younger men, and keep doing it until they are 65.

Of the 7 million physically handicapped, 97 pct are capable of productive work. And testing indicates their output will average one pct higher than unhandicapped workers in the same age group.

The number of workers 25-45 years of age is decreasing. And the supply of 45-65 year old workers is increasing. Testing makes it possible for the employer to put this trend to work in terms of economic output.

IS HE THE ONE? Bernard J. Del Giorno (r.), training supervisor at Republic Steel Corp. Chicago plant, explains an aptitude test to a prospective employee. Republic began pre-testing in 1944.



BACKGROUND—HANOVER WIRE'S SHIPPING CARTON;
FOREGROUND—BOOK MATCH "PRODUCT REPLICA" OF THE SHIPPING CARTON.

This Miniature Carries a HEAVYWEIGHT'S SALES PUNCH

HANOVER WIRE CLOTH DIVISION OF CONTINENTAL COPPER AND STEEL INDUSTRIES, INC., gets dramatic selling impact with its "Product Replica" book match program. The book match "Product Replica" of Hanover's shipping cartons are given out by representatives on sales calls and used as "hand-outs" at conventions and shows. These packages never fail to intrigue prospects . . . are always "conversation pieces" which leave lasting advertising impact.

Book match "Product Replica" packages are an exciting way to build product recognition or introduce a new product. They are far more impressive than any flat, one-dimension advertising—and surveys prove book match advertising delivers more readers per dollar than *any other advertising medium.*

"Diamensionized" book match advertising gives your sales message new 3-dimensional power, new magnitude and new penetration. Diamond "Counselors" are professionally trained to analyze your sales problems and suggest "Diamensionized" solutions. Book matches are invaluable for new product promotions, building company prestige, brand name and package recognition, salesmen's aids, reaching hard-to-see prospects.

diamond

For a folder describing modern "Diamensionized" book match advertising, write on your business letterhead to

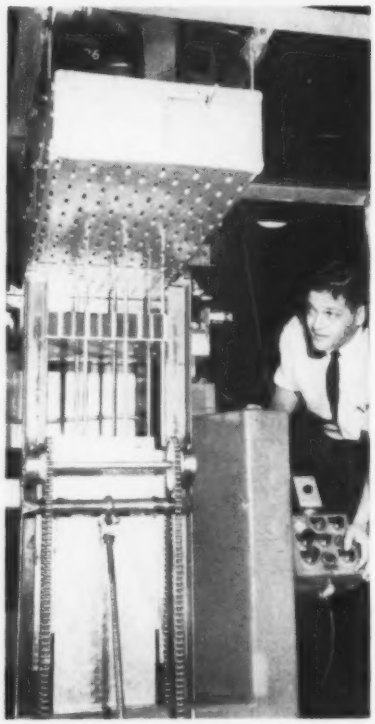
Book Match Advertising Dept.
DIAMOND MATCH Division of Diamond Gardner Corp.
125-F Paridon St., Springfield, Mass.

How to Stack Thin Strip

When the Westinghouse air conditioning plant at Staunton, Va., switched from 13-mil thick aluminum strip to thinner 7-mil for punching fins for fin and tube type heat exchangers, they ran into a real headache. The thinner strip wasn't heavy or rigid enough to stack by gravity feed as had been done with 13-mil.

Engineers found if they could eliminate lateral motion at the place where the cut-to-length strip was dropped that it would stack.

Their answer: As the strips are ejected from the press they are caught by suction from an overhead vacuum box. At precisely the right time the suction is broken and the strip drops.



Cement Tricks Work On Iron Ore

Iron miners are using a trick from the cement makers' book to save money.

A new type pelletizing plant using a rotary kiln and recuperative heating process originally developed for European cement plants will be put in at Humboldt, Mich., by Humboldt Mining Co., jointly owned by Ford Motor Co. and Cleveland Cliffs Iron Co.

Costly First—The installation will cost over $5 million. Arthur G. McKee & Co., Cleveland, will build it, and Allis-Chalmers Mfg Co., Milwaukee, is furnishing major equipment, including the kiln.

The new plant will have two pelletizing machines with rated annual production of 640,000 tons. By mid-1960 it will be turning out pellets of over 60 pct Fe from low grade jasper. Western-Knapp Engineering Co., Hibbing, Minn., will install necessary extra grinding and separation machinery ahead of the pellet plant.

Why It Will be Better—Major improvements hoped for are that the more gradual heat rise will make a harder pellet, less subject to abrasion and cracking. The bed is passed through the flame, rather than the flame passed through the bed of pellets. No fuel is put in the pellets, so no hauling is necessary. Kilns can be run on oil, natural gas or coal.

This type of rotary kiln was developed in the 20's in Europe as a fuel saver by Dr. O. G. Lellep, now a consultant for Allis-Chalmers. Only two installations have been made in U. S. cement plants, because fuel costs have been proportionally much lower here than in Europe until recent years. But over 50 have been made outside the U. S. since 1950 by Lellep licensees.

Kaiser Sales Move

Kaiser Aluminum & Chemical Corp. will move its general sales office from Chicago to Oakland, Calif. The move will begin almost immediately and is scheduled for completion by Sept. 1.

John Menz, marketing vice president, says the move is being made to get Kaiser policy-making groups, like production, sales and market development, all under one roof. This, Menz feels, would speed decisions and improve the company's marketing effectiveness.

Management Wins Two Strikes

Recently two long strikes ended when the unions backed down on the major issues.

In Cincinnati, the United Steelworkers finally accepted a renewal of their old contract for one year, with G. A. Gray Co., machine tool builder. The company had been struck for 29 weeks.

And the longest strike in Detroit's history ended when 1800 members of United Auto Workers ratified a new contract with Ex-Cell-O Corp. Affected were three Ex-Cell-O plants in Detroit.

The settlement follows very closely the pattern set by the major automakers. But this wasn't the issue. The union had sought a master contract for all seven plants. They backed down after 126 days.

Iron Ore

Pittsburgh Steel Co. has bought out the interests of Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. in the Bennett Mining Co., Hibbing, Minn. Pittsburgh now owns about 78 pct of Bennett.

Pittsburgh Steel made the move to strengthen its iron ore supply, said company president Allison R. Maxwell.

Bennett is a Mesabi Range open pit producer. Pittsburgh is spreading the cost over the next four years, so no new financing is needed.

No doubt influencing Pittsburgh's decision was the modern beneficiation plant owned by Bennett. It was built three years ago, at a cost of more than a million dollars.

Pickands Mather & Co., Cleveland, will operate the property.

James M. Underwood

A Low-Pressure Policy Pays Off

In 1946, some doubted that Vulcan Mold was big enough to keep Mr. Underwood.

Said the new president: "Maybe we can make it big enough." He did, and here's how.

J. M. UNDERWOOD: Friendly persuasion and service work better.

▪ In a day when high-pressure tactics are believed by many to be the only way to survive in business, Vulcan Mold and Iron Co. is thriving on low pressure.

In the last 12 years, Vulcan's share of the independent mold market has grown from 3 pct to 18 pct. Its moldmaking capacity increased from 40,000 to 195,000 tons annually. Employment, now at 600, was trebled. Earnings climbed steadily from $112,400 in 1946 to a peak of $561,000 in 1955. Last year, earnings were $423,400.

Man Responsible — Behind this growth story is James M. Underwood, Vulcan's president, whose management methods are about as enlightened as you can find in a company today.

To the casual acquaintance, Mr. Underwood appears to be the relaxed, unhurried, thoughtful type of executive. The term "low pressure" seems to fit. The atmosphere around his offices at Latrobe, Pa., is devoid of bustle and fuss.

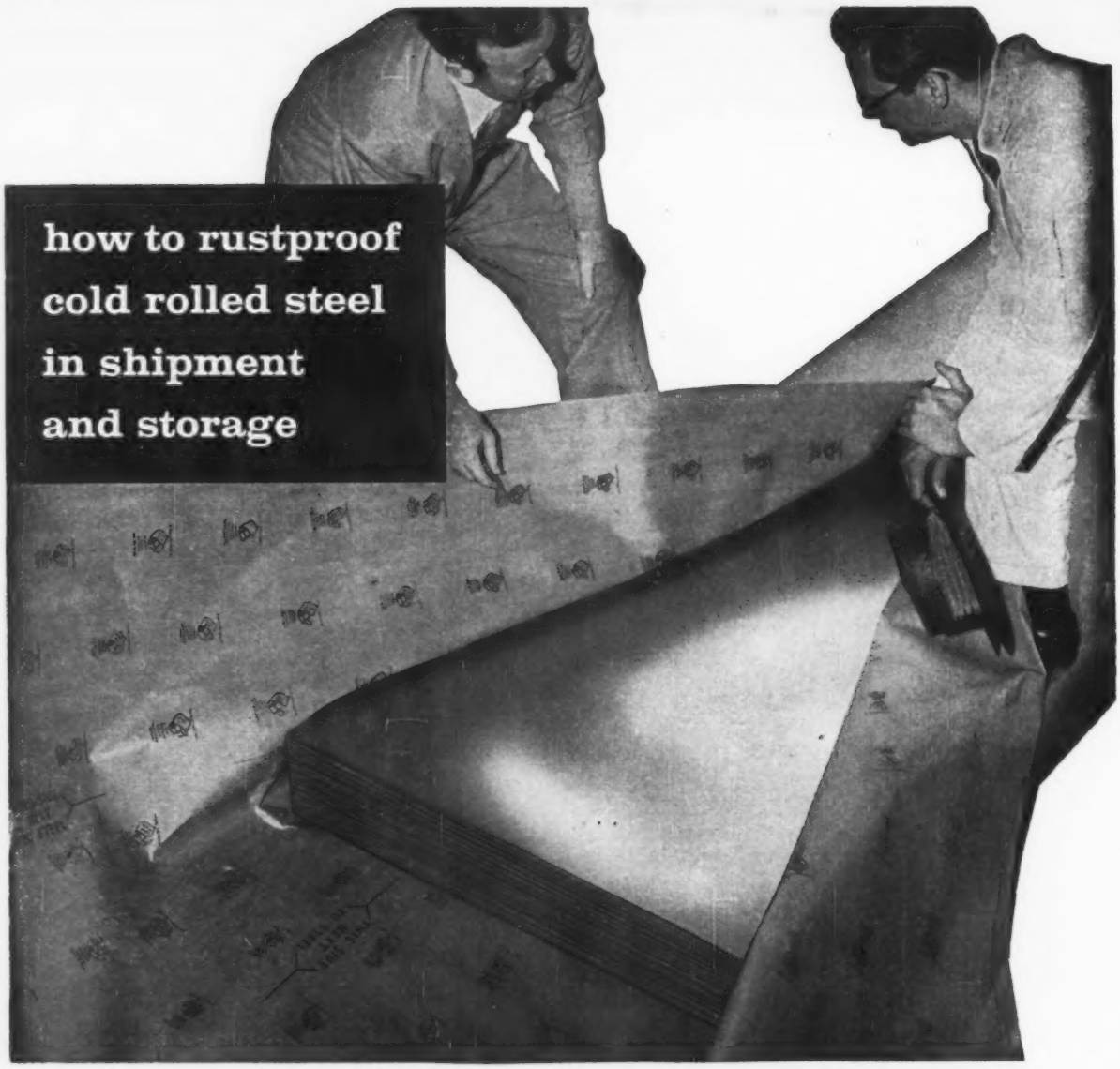
He Sells Softly, But—But beneath the calm is a rare form of contained vigor. In his own unobtrusive way, Mr. Underwood is able to stir up more genuine enthusiasm—and more profits—than an entire staff of hard-driving, high-pressure executives. He picks his people carefully but, once accepted, they get free rein to do their job.

Much of the company's progress Mr. Underwood credits to a low-pressure sales program. Vulcan's salesmen stress service. They're instructed to avoid the "hard sell."

Actually, the sales method works at three levels. Mr. Underwood maintains relations with the president of the customer firm. The sales manager keeps contact with the vice presidents and other upper echelon personnel. And the salesman tries to know and work closely with the superintendent, foremen, and others in the mill.

Finds Larger Market — Important in Vulcan's success was a long-range move made by Mr. Underwood when he took over the presidency in 1946. Up until that time, the company sold mostly small molds for tool steel ingots. The market was limited. So he set out to capture a chunk of the large openhearth mold business. He succeeded in almost tripling Vulcan's capacity and in boosting earnings as much as 500 pct.

A native Pittsburgher, Mr. Underwood was graduated from the University of Pittsburgh and Harvard Business School. He believes business men should take part in politics. Currently, he is serving his fourth term on the Latrobe City Council.



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Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4805 South Whipple Street, Chicago 32, Illinois.

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.

How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK®
by Cromwell

For over 38 years—
"Paper Engineers" for Steel

Industry Caught in Price Squeeze

Everybody knows that industry absorbs some cost increases. But who knows how much?

It's a safe bet that the tiny rise in consumer prices means a lot of absorption at the plant.

▪ It would be a big help to business if there was a ready index of industry prices comparable to the highly publicized Consumer Price Index.

This is a little facetious, of course. But many a businessman, reading that consumer prices edged up 0.1 pct between December and January, would like an indicator of what happened to his prices—this is, prices to him.

Who Gets The Blame — Of course, he probably knows what happened to his costs over any interval of time. But the point is that every time the Consumer Price Index goes up, the producer gets the blame. And he has little defense other than saying vaguely that his costs went up.

No one cares that while the manufacturer's selling price edged up a fraction of one per cent, many of the costs of goods and services to him may have gone up more rapidly. There is no general measure of industry costs.

Costs vs. Prices—What are some of these costs that fluctuate readily? Labor costs, transportation (of personnel and materials), financing costs of advertising and marketing, materials, utilities, fuel, plant medical care, office and manufacturing equipment, and many, many others.

Without going into any statistical study, it's a good bet that in the interval between December, 1958 and January, 1959, prices to industry went up more than the 0.1 pct climb of the Consumer Price Index.

Labor Is Documented—Only in the area of labor costs has industry made much of a case of how its costs climb in comparison with its prices. Of course, you will find industry making some noise over an increase in steel prices, and a few other commodities. But this is more or less in self defense against cost increases that have to be passed on.

In these days of universal determination to fight inflation, more and more pressure will be put on industry to hold its price line. But many new cost increases are on the way.

Chances are, the costs of industrial services will climb, with higher wages of service workers accounting for most of it. These and others will be difficult to absorb. Industry is likely to find itself on the defensive if it can't hold the line, or at least get its own position on the record.

Wages Show Business Leveling

▪ It's difficult to point to signs of a leveling off of business when the steel industry is aiming its operations at record levels.

Generally, most industries are not living up to their steel orders in terms of their own production. This is natural, because of inventory building and strike hedging. It's only pointed out to bring the picture into focus.

Pay Dips a Trifle—The factory worker's take-home pay in January was at the highest rate in history for the month, but still was under December, 1958. Here again, this is natural, because of seasonal factors and an increase in social security. But it does indicate a stable rate of employment and some cutbacks in overtime.

Actually, the average hourly wage earner is about $4.25 a week better off this year than a year ago in spendable earnings. For January of this year, the spendable earnings of a worker with three dependents were $78.70, based on total earnings of $87.38.

Buying Power Up—According to U. S. Dept. of Labor weightings, buying power is about 5 pct higher than a year ago.

The minute increase in cost-of-living during the month, (above) had virtually no effect on buying power. Incidentally, the comparatively stable cost-of-living in recent months kept the autoworkers' escalator clause from functioning. The c-o-l increase from October to mid-January was not sufficient for a cost-of-living raise.

Railroads Take a Look At Their Equipment

The railroads, spurred on by an improved profit outlook and pressure from shortage - threatened users, are looking to their depleted stocks.

It's nothing like a freight car boom, but January orders totaled 4007 new cars. This compares with only 401 a year ago. Over half of the new orders were for box cars, about a fourth for gondolas.

Good bet: You're paying for lubricants you don't need

Does this case sound familiar to you?

A midwest firm was buying lubricants on the recommendation of every department head, foreman or even operator. Inventory — often duplicated — was scattered all over the plant, yet shortages in one spot were never related to overstocks in another. The result: costly overstocking, extra handling, increased dangers of misapplication.

Management realized they had a problem — instituted an Organized Lubrication Plan. Now they use 20 lubes instead of 97, have cut their purchase orders from 300 to 12 per year. Direct savings are estimated at thousands of dollars annually.

Can Organized Lubrication save money in your plant? Contact your local Texaco Engineer or write for:

"Management Practices that Control Costs via Organized Lubrication."

The Texas Company, 135 East 42nd Street, New York 17, N. Y., Dept. IA-81.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

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How Deep Is Labor-Management "Bitterness"?

There's no doubt that relations between labor and management have become strained.

But it's questionable whether top-level meetings outside the bargaining room would achieve a practical result.

At least that's the consensus of labor-management thinking at present.—By Tom Campbell.

▪ Does management hate labor? Or labor leaders? Are management and labor more bitter toward each other?

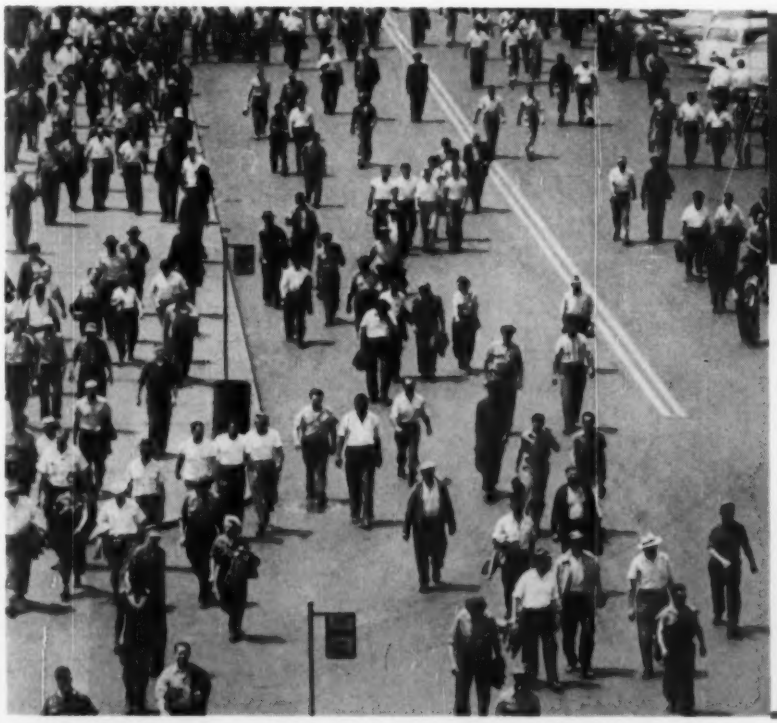
These were a few questions raised when Arthur J. Goldberg advocated closer relations between labor and management before "it was too late." Mr. Goldberg is counsel for major labor unions, including the United Steelworkers of America, where he is one of the bargaining team. He recently sounded an alarm that management and labor were splitting farther apart and becoming increasingly bitter.

What Goldberg Suggested—Mr. Goldberg's theme was that only at bargaining time did management and union leaders have time for one another: Then tempers were frayed, the heat was on, and the atmosphere was anything but conducive to understanding each other's problems.

His suggestion that both sides should sit down together between negotiation periods went over pretty much like a lead balloon with management and labor leaders.

But Was He Right?—It would be easy to get the wrong slant to this whole question of who is bitter towards whom unless there is considerable thought and survey of conditions. In the first place maybe there isn't any lasting bitterness per se at all. Perhaps Mr. Goldberg's assumption is too general. He may be taking into account only part of the picture. Also, the question of bitterness may be relative. If it exists, how does it stack up with the situation say 15 years ago? Twenty years ago?

Also, there is a distinction between labor, labor leaders, unions, and non-union or unorganized workers. Certainly labor in general



1959's Union-Management Crisis

Are management and labor really drifting farther apart?

Tom Campbell, editor-in-chief, The IRON AGE, traveled hundreds of miles, interviewed top management and labor people to find the answer.

This article is the result of these interviews plus Mr. Campbell's extensive background knowledge of labor-management relations in this country based on years of reporting experience.

is not bitter toward management. Nor is management bitter toward labor in general. Labor as a whole is too busy living, working, bowling, raising kids, and seeking more money. It has little time or inclination to care too much what management thinks or doesn't think. This is not just editorial jargon, it is the distillation of talks with labor in all walks of life, over a long period.

First Impressions — It is true there is the impression that things are not going well with management and labor chiefs, especially this year. That may be due to the exasperation and frustration of management which sees wage-increase-after-wage-increase forcing prices too high in the domestic and in foreign markets. While management feels this way and while it may take strikes in an effort to "hold the line," management has no desire to bust the unions or to see the union leaders lose their jobs. Hatred or bitterness if it comes is a fleeting emotion that can't last long with a management which must look out for more tangible and practical things.

Thus Dave McDonald, Steelworker chief, almost has a compulsion to shout and rave against management at the "proper" time. He must—or so all labor chiefs think—get a "big deal" for the workers every year. He must do something big and new to stay on the job. He must, for his own security, outdo his rivals in the union movement. All top labor chiefs are contenders for the big job at the top now occupied by George Meany.

Friendly Enemies—So from the standpoint of labor chiefs, the so-called bitterness between them and management may be the same as that displayed by rival lawyers at a big trial. During the court room scenes they act as if they are trying to get the "chair" for each other. Out of sight of the public, they are just as likely to congratulate each other on their various "clinchers."

There is of course "unconscious" bitterness engendered by insecurity and a desire to be a big wheel. And it is often caused by union officials' falling into an uncomfortable trap. But even that indirect bitterness which often produces bad effects in the national economy is not the type that could be straightened out by yearly or monthly tete-a-tetes between labor and management.

What Management Thinks—Management in general does not believe that meetings with labor chiefs are in order as suggested by Mr. Goldberg. It feels this way for at least three reasons: The meetings are not needed, labor has everything pretty much its own way now; and such meetings, carried too far, could result in throttling competition by tending toward a labor-management monopoly that would sooner or later be taken over by government. Not all management people feel that way but most of those contacted say nothing would come out of such meetings that would be beneficial to the workers, to management or to the economy.

Some years ago there was a section of business which was exceptionally cooperative with labor. So much so that other managements considered them pushovers at the expense of the consumer and other industries. That group has pretty well "had it." But there is no bitterness here nor is there an acceptance of the idea that there is a need for cozy, private, and personal meetings among labor union heads and management.

Middle Roaders—Another group of business people labeled by its labor relations mood would be the "middle of the roaders." This group balances the responsibilities it has to company, stockholders, employees, and the nation against the cost of the union demands and

"A willingness to talk to each other is a necessity. And by conversation I mean an exchange of ideas, on a great variety of subjects, *outside* the bargaining table.

"I am convinced that labor and management will have to move away from the bargaining table and get together across the dining room table—into each other's living rooms."

—James P. Mitchell
Secretary of Labor

tries for a settlement without too much dislocation.

But even this group has "had it" because the more it gave, the harder it was when the new contract date came around again. It has realized that union demands engineered by a slick corps of negotiators, plus tub thumping for the public's edification, is a big business.

Tough Bargainers—Finally, there is the third management group. It puts up a stiff front, makes its own demands and fights even fiercer than its union counterpart. This strong-headed bunch appears to be centered in the electrical and electronic fields and lately also in the glass field. This viewpoint—that the unions must get no more than they are entitled to after a knock-down, drag-out fight — is not likely to stand still for forums on how to be nice to labor unions.

As to the workers themselves—organized and unorganized—they couldn't care less what labor and management do or don't do as long as they get a raise each year or so. True, there is a vocal minority among workers which sees the road down which labor unions are taking them. But they are sidetracked by an apathy of the majority that is even worse than the public exhibits towards a balanced budget and Mr. Eisenhower's (and their) problems.

A Way to Fascism?—Strangely enough many management people and quite a few labor chiefs feel privately that high level hob-nobbing for the purpose of understanding each other could eventually lead management and labor down the road to fascism.

So this week and this year management has its cross to bear: It must fight tooth and nail for its rights and beliefs. It must face up to the fact that putting its case before its employees and the public is a lot easier than causing either of those groups to understand and believe in it as much as management does. At the same time labor statesmen-to-be are certain to know in their hearts that many unions and their chiefs are riding to disaster; for them, for the workers, and possibly for entire industries. They must live with this knowledge too and wonder when the boom will be lowered.

No Big Rush—And all this adds up to the unmistakable fact that there will be no rush to form union-management panels where both sides will try to see each other's problems in cushy surroundings far from the "madding" Press.

Let's face it: The cold, hard facts of collective bargaining must still be reckoned with regardless of top-level meetings on the "big" problems.

Here's Proof—Witness the reaction of Mr. McDonald to the proposal of Sen. Kefauver that steel prices could be held in line if steel wage demands were limited to average increases in productivity.

"I wish Sen. Kefauver would keep his nose out of my business," snaps Mr. McDonald.

Wants Free Hand—The steel labor chief is not interested in any proposal that would tend to tie his hands at the bargaining table. He's not yet ready for "labor statesmanship."

The "facts of life" for Mr. McDonald are these: (1) There are still thousands of steel workers out of jobs despite revival of the steel market, and (2) in order to justify his position as a union leader he must get more—and still more—for his members. A "productivity" wage boost is not his idea of "more."

A Dual Mission?—In fact, Mr. McDonald now feels that he has a dual mission in life. That is, he wants to improve the lot of his members and at the same time protect them against automation in steel. He gives lip service to automation, but little more.

Thus, the steel labor head wants a free hand in formulating demands on the steel companies and at the same time he talks about a form of the short work week to spread available work among his members. He thinks a three-month leave of absence for every five years of employment in steel would be a satisfactory way of accomplishing this objective.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Why Push Panic Button?

What Campbell Found—In his talks with management and labor, Tom Campbell, editor-in-chief, The IRON AGE, found general agreement in the following areas:

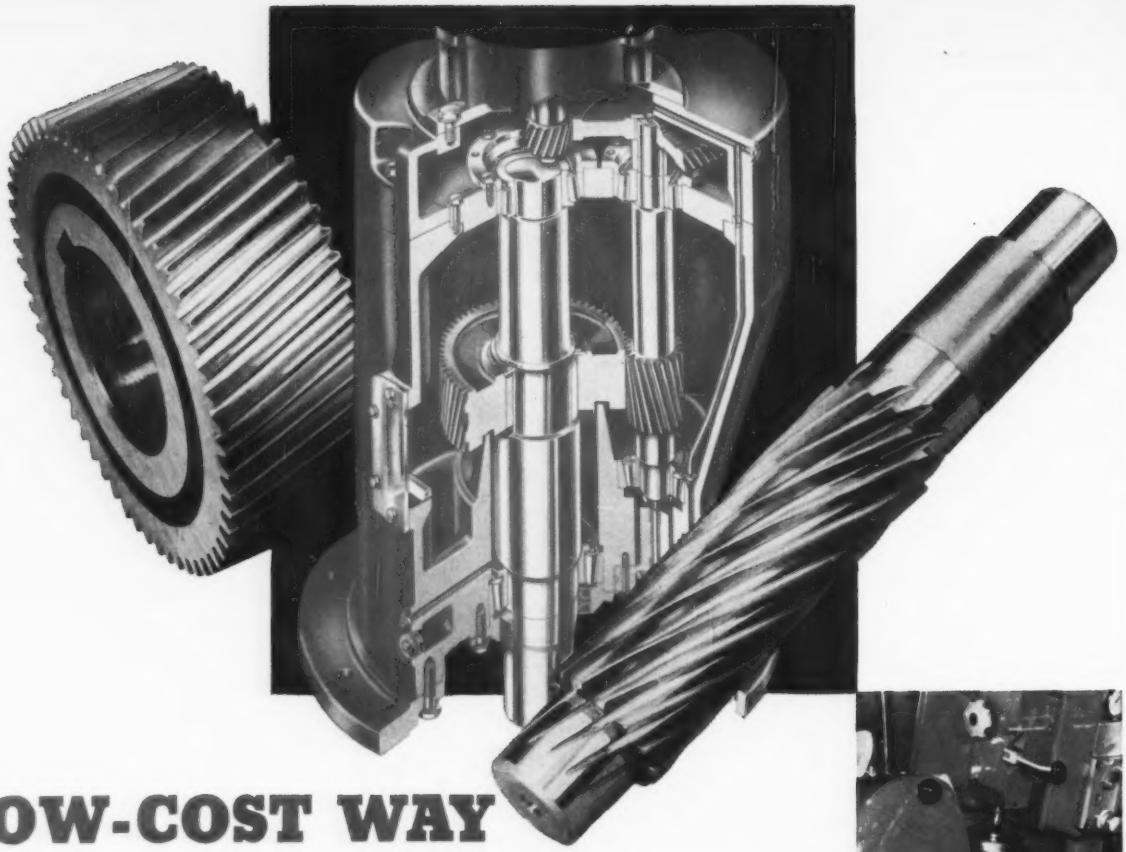
There isn't too much bitterness between management and labor or between labor leaders and management compared to what prevailed 15 or 20 years ago. Thus there is no emergency. There is just a strong difference of opinion as to what ought to be done with wages.

Matter of Necessity—Labor leaders are compelled . . . to get all they can, no matter what happens. To do otherwise would mean eventual loss of leadership.

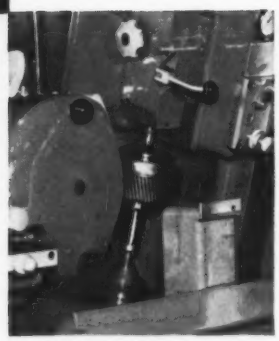
All workers, whether organized or unorganized, will side with the union if forced to choose when the point at issue is more money.

Day of Reckoning—Management knows (and so does the union boss) that sooner or later it must make a stand against higher wages if it wants everyone to believe it really cares and is no pushover.

Love feasts and brotherhood between management and labor make for good speech material but there is only slight chance that anything of practical use will come of this any time soon.



LOW-COST WAY to Quieter Gears



Gears for a well-known line of industrial mixers are ground to runout tolerance of 0.0005" T.I.R. at high speed and low cost.

Finishing power transmission gears to tolerances measured in "tenths" used to be costly. But not any more: they can now be ground on the No. 12 Fellows-Reishauer Gear Grinding Machine which combines low-cost, high-speed operation with outstanding accuracy. As a result, these heavy-duty industrial mixers now run more smoothly and efficiently than was ever possible before.

The Fellows-Reishauer is built in America by Fellows, under a license from Switzerland's Reishauer Tool Works, Ltd. Fast and simple to set up, it permits economical grinding of single gears as well as long production runs. Capacities are 12" outside diameter for both spur and helical gears; 6¾" face width for spurs. Max. face width for helicals depends on pitch and helix angle.

Fellows gear production and inspection equipment can probably help you lower your gear production costs, whatever your requirements. The complete line, for gears from 1/16" to 120" P.D., includes Fellows Gear Shapers, Pfauter Gear Hobbers and Fellows-Reishauer Gear Grinders as well as a number of other more specialized machines. For full information, get in touch with any Fellows office.

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THE PRECISION LINE **Fellows** *Gear Production Equipment*

Are Electric Autos Coming Back?

Two New Projects Spark Talk of a Revival

Auto operating expense, noise, and smog programs are helping revive the electric cars and delivery trucks.

One model, developed by Stinson Aircraft Tool & Engineering Corp. nears production stage.—By H. R. Neal.

▪ New signs of life are showing up in a long dead vehicle — the electric auto.

A San Diego dentist plans to take the bite out of automobile operating expenses and spark a new trend in around-the-town transportation. In Cleveland, another electric auto project is under way. Both are drawing support from several large electric utility companies and storage battery makers.

Noiseless and Smogless—Powers in the revival are Stinson Aircraft Tool & Engineering Corp., San Diego, and Cleveland Vehicle Co., Cleveland. Their cars promise to be the first electrics produced in the U. S. since Detroit Electric ran out of juice in 1931-2.

Better roads and improved internal combustion engines short-circuited the electric car. Gasoline-powered cars became bigger, faster, and grew in numbers — the very things which may lend support to revival of the electrics.

To noise- and smog-plagued cities such as Los Angeles, the electric auto might be a partial solution to the problem.

Alone in the Field—The nearest things to electric autos still made in this country, until now, are golf carts, industrial trucks, and the like. At least two electric trucks are still being manufactured in France — the Sovel and the Vetra.

Stinson Aircraft's new car, the Charles Town-About, is named for Dr. Charles H. Graves, a San Diego dentist, inventor, and real estate developer who is co-inventor of the vehicle.

In Production Soon—By the end of this month Stinson hopes to have the first production models of its Charles Town-About running silently off the end of its assembly line. The company refers to it as a four-passenger coupe. It will cost about $2800 in San Diego.

Dimensions are nearly identical to those of the Volkswagen: overall length, 164 in.; width, 60.5 in.; and height, 57 in. The wheelbase is 94.5 in. Weight is given as 1875 lb, about 300 lb more than the Volkswagen, of which more than 25 pct is contributed by the batteries.

Fiber-Glass Body — To hold down weight, the Town-About body is molded fiber-glass and weighs about 300 lb. The frame of welded aluminum tubing weighs about 57 lb and contains a cradle for more than 500 lb of batteries. The suspension system is torsion bars.

Batteries are single replaceable-cell Selenium batteries for the 48 volt system and are rated at 260 ampere hours. However, this rating

All Charged for Drive Around Town

FOUR-PASSENGER COUPE: This is the battery-driven Charles Town-About built by Stinson Aircraft Tool & Engineering Corp. Sized about equal with a Volkswagen, the car has a top operating speed of 58 mph.

could be changed before the first models are produced.

Small Motor a Secret — As it stands, top speed is 58 mph and the normal driving range is 77 miles, although the company hopes to increase the driving range to about 125 miles. Electricity costs have been placed at about 20¢ for 80 miles. A full recharge takes about 7 hours, with the battery charger plugged into any regular 110 volt outlet.

Speed and distance characteristics are considered remarkable in view of the fact drive-power is supplied by two 3.2 hp DC motors rated at 3300 rpm. How so much power is gotten out of such small motors is Stinson's big secret.

Easy to Operate—Fuel, temperature, and oil pressure gages are replaced by a pair of ammeters and a voltmeter. When ammeters give matched readings, everything is in order.

The voltmeter, indicating the charge level of the batteries, is marked in green, yellow and red so the driver can tell at a glance how soon he must head for the nearest electrical outlet.

Operation of the vehicle is simple. An ignition key turns on the current; an accelerator pedal governs speed. A two-position lever provides low and drive ranges for forward motion. A dash-mounted push button produces reverse.

Utilities Buy First—Production schedules for the Charles Town-About are starting off at a modest pace—about four to six units this month, and a goal of 500 for the first production year.

Some 50 electric utility companies, which have ordered about 70 vehicles, will receive the first production models for testing and promotion.

Cleveland Progress Report — Cleveland Vehicle Co. is not nearly so far advanced in its plans for a passenger car. It is experimenting in adapting a Rambler American body to electric power, expects to have its model completed by June. Production would follow in less than a year—although the firm has declined to estimate a hoped-for volume.

At this stage, C-V isn't sure whether it will buy Rambler American bodies or one of its own design. But the company intends it to be a six-passenger car on a 110 inch wheelbase. Top speed would be held down to about 40 mph because of its intended use—as a second car or local fleet use. Price "will be about the same as present small cars."

Interest in Trucks — Currently, C-V is concentrating its primary efforts on trucks, has sold 42 of the 50 it is building. Six models, ranging in price from $2500 to $4500, include three van types.

While the company is not overlooking the potential offered by the fleets owned by utility companies, it sees an even larger market in route-type delivery vans in large cities—milk and bakery routes, dry cleaners, and parcel delivery.

More Fiber-Glass — Its trucks are of unitized tubular steel construction with exposed steel sections covered with fiber-glass for protection against corrosion. Bodies are made of die-formed fiber-glass panels, roof and floor pans, reinforced with styrafoam for added strength and insulation. A translucent roof covers the driver's compartment.

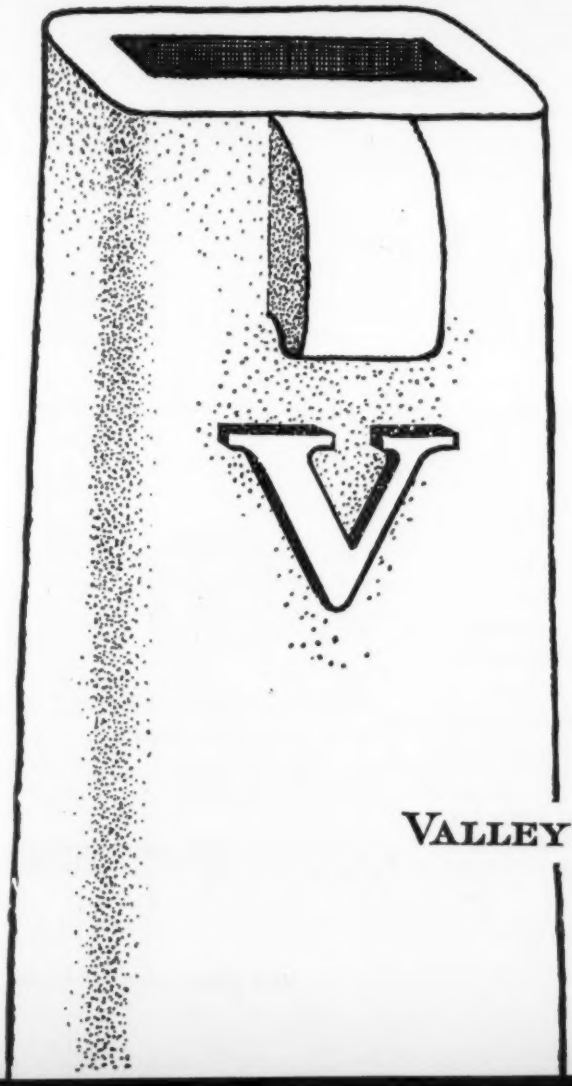
Chassis and body weight for a typical van-type truck is 3000 lb. The standard Exide-Ironclad battery weighs 2200 lb. And it has a payload capacity of 3000 lb. A single, series-wound, heavy duty motor manufactured especially for the truck drives it at 25 to 30 mph.

Automotive Production

WEEK ENDING	CARS	TRUCKS
Feb. 28, 1959	128,319	24,832
Feb. 21, 1959	120,780	25,443
Mar. 1, 1958	91,508	17,451
Feb. 22, 1958	89,977	17,843
TO DATE 1959	1,024,639	198,015
TO DATE 1958	881,526	154,926

*Preliminary Source: Ward's Reports

The Bull of the Woods



Tomorrow

we'll harness the energy of the sun . . . . .

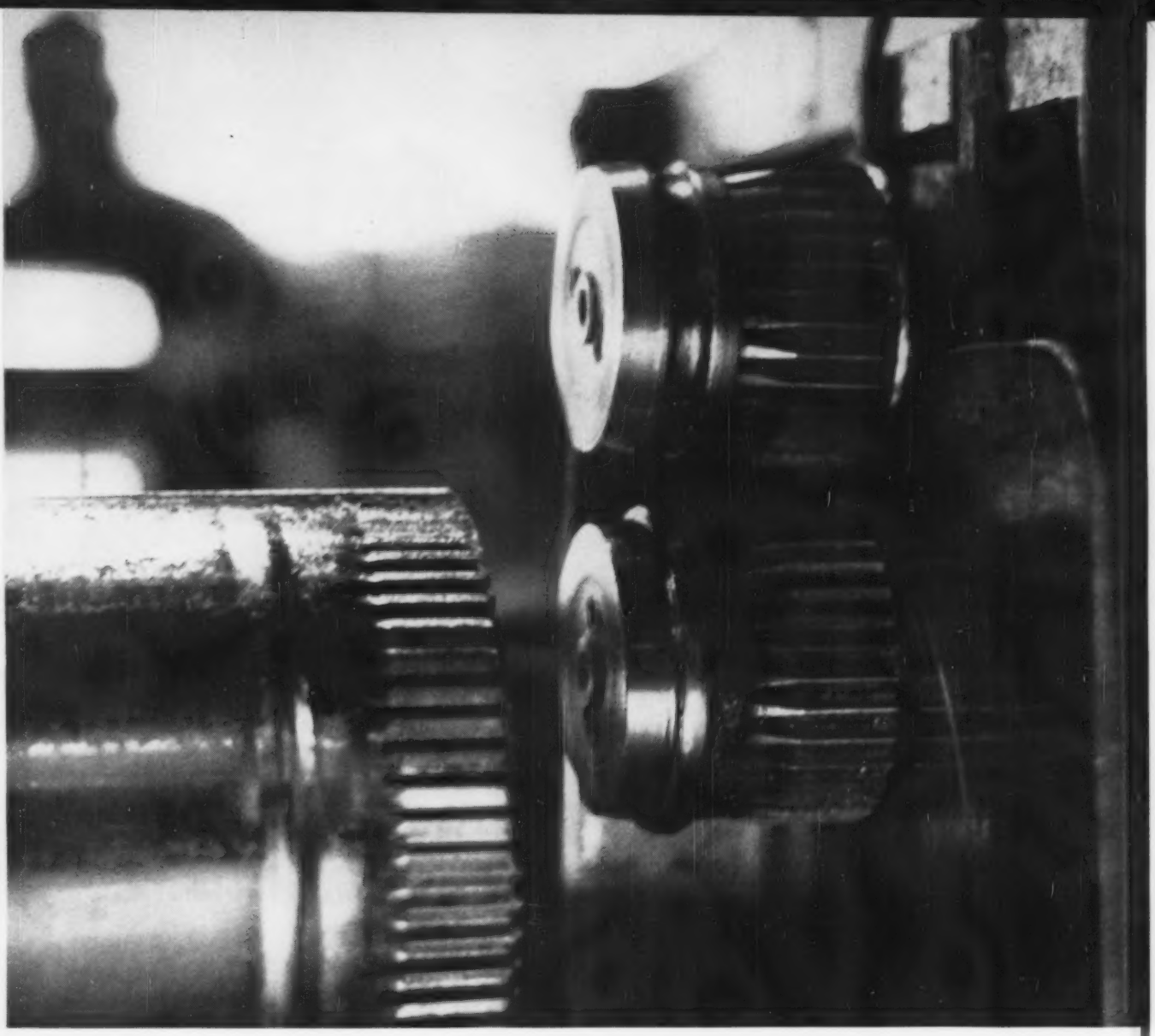
but even then

steel will be poured into

VALLEY INGOT MOULDS

VALLEY MOULD AND IRON CORPORATION

GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio



"NO REJECTS IN OUR WORK! WE CRIMP CHIP-PROOF WEIRKOTE"

See for yourself, as so many others have. Put zinc-coated Weirkote through its paces. Give it the business—the toughest, most tortuous jobs. Crimp it, bend it, twist it, spin it, draw it. Work it to the limits of the steel itself. Then take a close look.

Not a chip or flake mars its smooth zinc surface! And why should they? Weirkote's continuous process integrates zinc and steel so tightly that chipping and flaking do not occur and a new high in corrosion protection is assured.

Can you imagine what this means to repeated, top-notch production results? To the goodwill of your customers who will continually get the best finished products on the market? To your peace of mind, rid, at last, of annoying, costly rejects?

In spite of all these advantages, Weirkote's cost is low. One more good reason why you should write today for a free 12-page booklet that explains in detail how Weirkote can help you. Weirton Steel Company, Dept. A-8, Weirton, West Virginia.

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Is Lobbying Tax-Deductible?

Supreme Court Ruling Raises Some Doubts

New legislation may be needed to clear the air for businessmen lobbyists.

Court's decision viewed as a blow to business' right of petition.—By G. H. Baker.

▪ Management may find the tab for political lobbying is much stiffer than it had expected. The U. S. Supreme Court recently decided money spent for lobbying is not necessarily tax-deductible.

Many firms today retain lobbyists (See Page 40), either directly or through their trade associations in Washington and in some state capitals. These costs, for the most part, have been deducted from income taxes. But now the Supreme Court has cast grave doubt as to the legality of this deduction.

All in Favor — Specifically, the Court held 9-0 that sums spent by liquor dealers to defeat adverse state legislation are not deductible on federal income tax returns.

In Washington, some registered lobbyists grimly see the Court's decision as a severe blow at the right of businessmen to express themselves to their federal and state legislatures. They say a blow against lobbying by one type of businessmen (liquor dealers, in this case) is a blow against all businessmen who have something to say.

Congress' Move — This case is causing some grave concern here. New legislation may be necessary to clarify the right of businessmen to petition their government.

Foreign Aid

President Eisenhower is standing firmly behind his $3.9 billion foreign aid program, making it clear he will use his veto as a weapon to get the funds he wants.

Top Republican congressional leaders say that Ike is taking the same "firm" stand toward his request for overseas funds as he now is toward Russia's Berlin taunts.

Fund cuts which would jeopardize the mutual security program and slow U. S. efforts to bolster anti-Communist allies would eventually turn this country into a "garrison hemisphere," he believes.

Congressional Democrats have been considering paring Ike's foreign aid budget by anywhere from $500 million to $1 billion. Last year, the lawmakers cut his request for these funds by $650 million.

Scrap Import Duty

Legislation to continue the long-time suspension of import duties on most types of metal scrap is pending in Congress.

The measure is sponsored by Rep. Joseph E. Karth, D., Minn. It would continue the suspension of import levies on most ferrous and non-ferrous scrap for another year.

The duties will be restored next July 1 if the measure is not passed. It is expected to again be approved.

'Spenders' Pull in Horns

What's In a Name—Democrats in Congress are getting testy over the "spender" label that's been stuck on them. Big-volume mail from the voters, plus needling from some Republicans on spending, is getting under their skins.

They defend big spending on the grounds that "the voters want it," but at the same time they are quietly beginning to trim some of their more ambitious projects.

Down But Not Out—Example: Democrats first voted a whopping $565 million to build airports. After reading their mail, they trimmed this to $465 million—a large cut, but still 'way over the $200 million programmed for this in the Eisenhower budget.

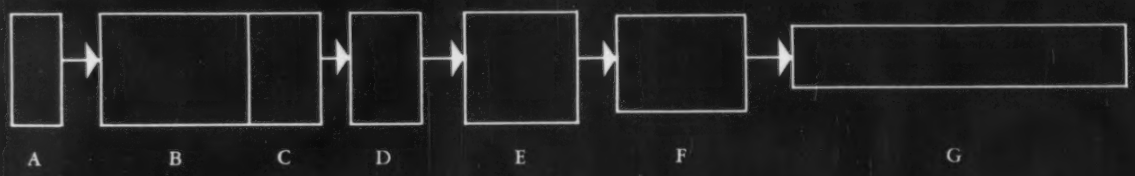
Already, there's behind-the-scenes talk of restoring later this spring most of the cuts now being made. But a strong tide of mail from voters can help hold the line.

More to Come — Meanwhile here's further evidence of even bigger defense spending to come: National Aeronautics and Space Administration is warning the Congress that its current budget ($500 million) is peanuts, compared to what it expects to ask for (and get) from the Congress in the next few years.

"We are making the down payment on programs that inevitably will cost very much more in the years ahead," says Dr. T. Keith Glennan, NASA chief. "Before we have completed this first U. S. effort to put man into space, the bill will have exceeded $200 million."

Another example of rocketing costs: The 1,000,000-lb to 1,500,000-lb thrust engine in the current budget is a $12 million item. The cost goes to $30 million in the 1960 budget.

FROM HOT ROLLED ROD THROUGH PATENTING, CLEANING AND COATING IN ONE CONTINUOUS OPERATION



THE LESCHEN WIRE ROPE DIV. AUTOMATED STRAIGHT-LINE PRODUCTION METHOD

A. Twelve-strand Pay-off Reels.

B. Rod Annealing Furnace.

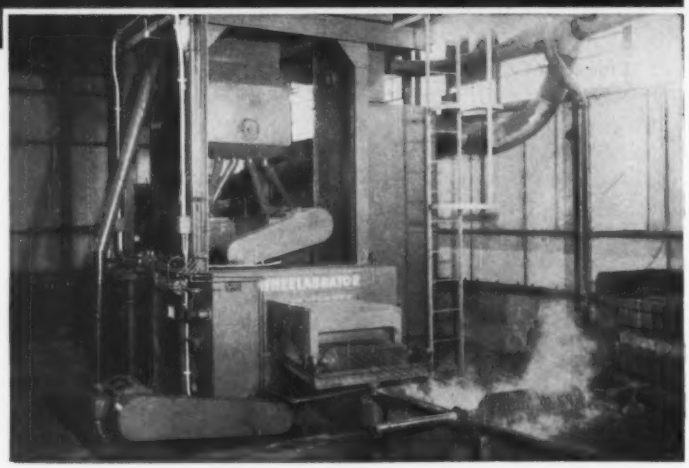
C. Lead Quench (Patenting).

D. Water Quench.

E. Wheelabrator Abrasive Blast Descaling Cabinet.

F. Borax Coating and Drying.

G. Horizontal Takeup Recoilers.



Leading producers of wire products are now using Wheelabrator® straight-line abrasive blast descaling as the shortest distance between steel rod and wire profits. At H. K. Porter Company, Inc., Leschen Wire Rope Division, St Louis, for example, this process is resulting in exceptional production efficiency and economy.

The automated processing line starts with hot rolled rod, and in one continuous operation produces cleaned and coated rod for subsequent drawing. Wheelabrator mechanical blast descaling is an essential step in this process. It cleans twelve strands at a time in line with patenting, coating and drying and delivers cleaned and coated rod for multiple hole drawing. There is no interruption and no intermediate handling required. Furthermore, the line operates continuously five days a week, 24 hours a day without downtime.

All scale or rust is completely removed down to virgin metal, at speeds required for patenting. The fine matte finish obtained holds a more uniform coating and provides excellent drawing characteristics. This blast descaling process offers freedom from the problems associated with acid pickling. And, through automated production, important additional savings in time and labor costs are achieved by reducing "in process" inventories.

It will pay you to consider this new process for cleaning any type of ferrous or non-ferrous hot rolled rod and bar stock for cold drawn products.

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HOW TO AUTOMATE YOUR WIRE DRAWING LINE

This new booklet explains how Wheelabrator blast descaling can enable automation of your wire production. Write for Bulletin 148-D.

WORLD'S LARGEST MANUFACTURERS OF AIRLESS BLAST CLEANING EQUIPMENT AND STEEL ABRASIVES

Computer Sales Will Stay High

Industrial Orders May Triple By 1968

Look for upsurge in computer sales to batch and continuous process industries, say General Electric marketers.

GE is increasing work force at its computer center in Phoenix. —By R. R. Kay.

▪ Computer industry sales are running at an $800 million per year rate. But by 1968 they will triple, according to General Electric's Computer Dept.

Factory-type processes this year will use $40 million worth of computers. In 1968 sales to this market should be $400 million.

Why It Grows—Why so optimistic? George A. Hagerty, marketing manager for G. E.'s Computer Dept., says the industry is just a baby. But it's one of the fastest growing industries on the U. S. business scene.

Mr. Hagerty sees a big upsurge in computer sales to the batch and continuous process industries. His company will soon announce new installations in the steel industry.

How It Grows—What kinds of computers are in use today? Seventy-five pct of them are the large and medium scientific types; large and small business data systems; airborne and tactical ground military computers; and general purpose analog computers.

The balance of 25 pct is in transportation, utilities, and basic industry. It's this area that G. E. believes has a vast potential. And the company is giving it No. 1 emphasis.

Bloom in the Desert—Phoenix, Ariz., is the site of G. E.'s computer manufacturing operation. A 100,000-sq-ft headquarters building has just been dedicated.

By September the company will occupy ¼ million sq ft in the desert area.

The Computer Dept. will take on 500 more employees during 1959. This will bring total employment to 1500 persons. Most of the new workers will be in manufacturing.

Western Spurs

California's Governor Edmund G. "Pat" Brown says he is dead serious about setting up an agency to push his state's industrial growth. California needs 200,000 new jobs a year to take care of the families moving in.

Washington state's legislature is considering a sugar-coated package to make it easier for new industries to locate there, and for present firms to expand.

The lawmakers are studying measures which would allow 10-year tax deferments and other benefits.

Jet Fighter Tailored for Missile Age Missions

MULTI-PURPOSE FIGHTER: This is mock-up of new N-156F supersonic fighter developed by Northrup Corp.

MARVEL *GUIDANCE SYSTEM**

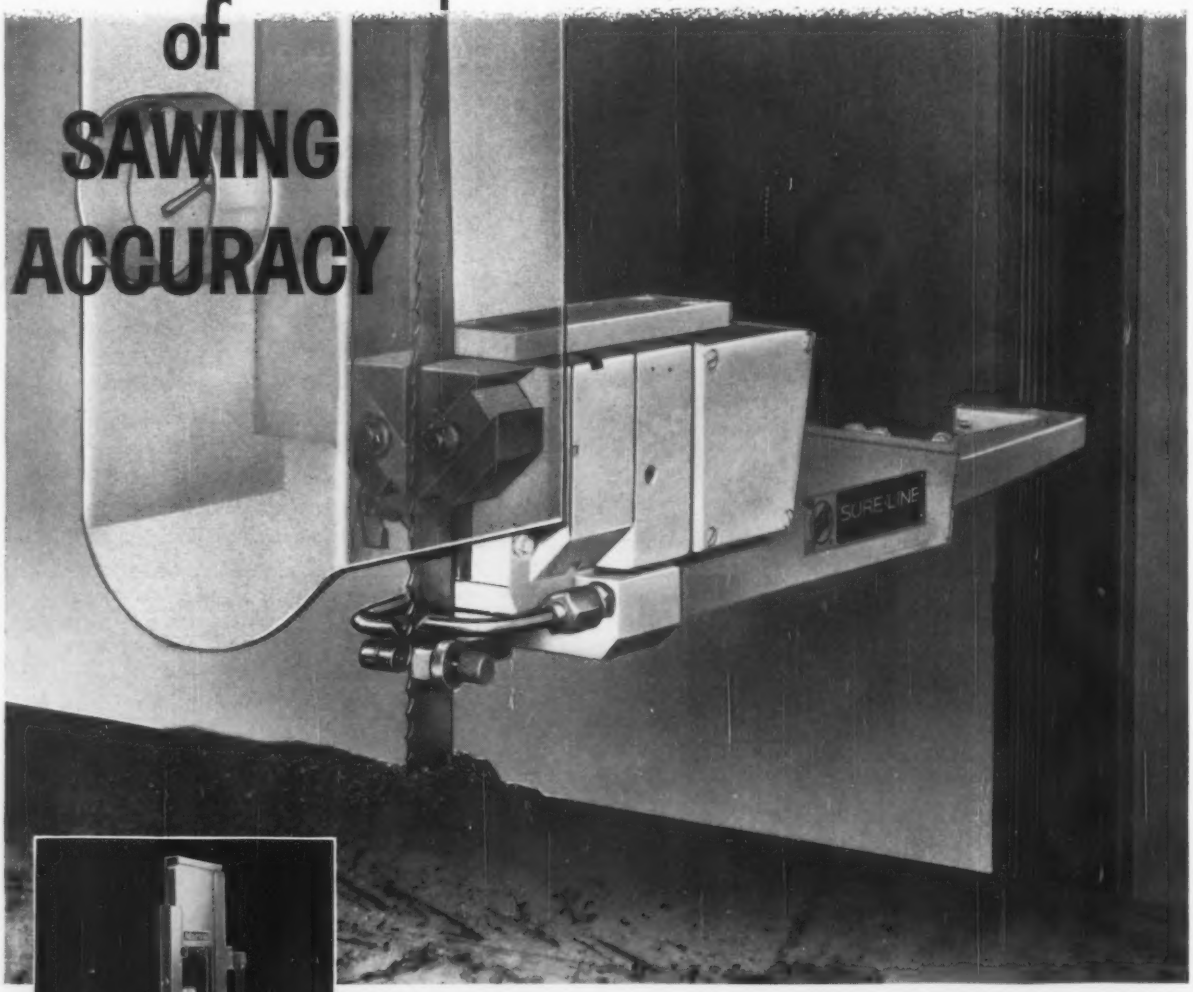
...SECRET of SAWING ACCURACY

A new MARVEL invention—the "Sure-Line" Automatic Blade Controller—*at last* attacks the problem of maintaining accuracy in high speed band sawing.

This simple, but effective electro-mechanical guidance system invented and developed by MARVEL, actually "steers" a band blade while it is cutting, to maintain a straight path!

Designed as an integral part of, and available only in the new MARVEL 81 Series All Hydraulic Band Saws, the "Sure-Line" guidance system continuously senses and automatically corrects any tendency of a band blade to cut inaccurately. Now—with the MARVEL "Sure-Line" guidance system, every square inch of cutting life is squeezed out of each blade. The result: longer blade life, and cutting costs lowered to a point that makes high speed production cutting-off with a band saw economically practical.

A demonstration of the new MARVEL No. 81 All Hydraulic Band Saw will prove it. Write today for the complete story, and ask about a demonstration.



***SURE-LINE** AUTOMATIC BLADE CONTROLLER
(BASIC PATENT APPLIED FOR)

ARMSTRONG-BLUM MFG. CO. 5700 W. BLOOMINGDALE AVE. • CHICAGO 39, ILLINOIS

MARVEL *Metal Cutting* SAWS
Better Machines–Better Blades

More Help Is Coming Your Way

Electronic Advances May Let You 'Talk' to Tool

New system permits use of simple word commands to direct complex machine operations.

Development represents a sequel to numerically-controlled tools.—By E. J. Egan, Jr.

▪ A new pidgin-English type of language with a vocabulary of 200 or 300 words might have you machining complex contours with numerically controlled machine tools in a couple of years.

With these simple word commands, programming the continuous path for a cutting tool is about as easy as pointing out to a stranger in town that the public library is two blocks down and one block to the left, upstairs over the fire hall.

Who Developed It—The name for this new system is "APT"—meaning Automatically Programmed Tool. It was developed by the Servomechanisms Laboratory of Massachusetts Institute of Technology under an Air Force-Air Materiel Command contract. Nineteen member companies of the Aircraft Industries Assn. cooperated closely in every phase of the program.

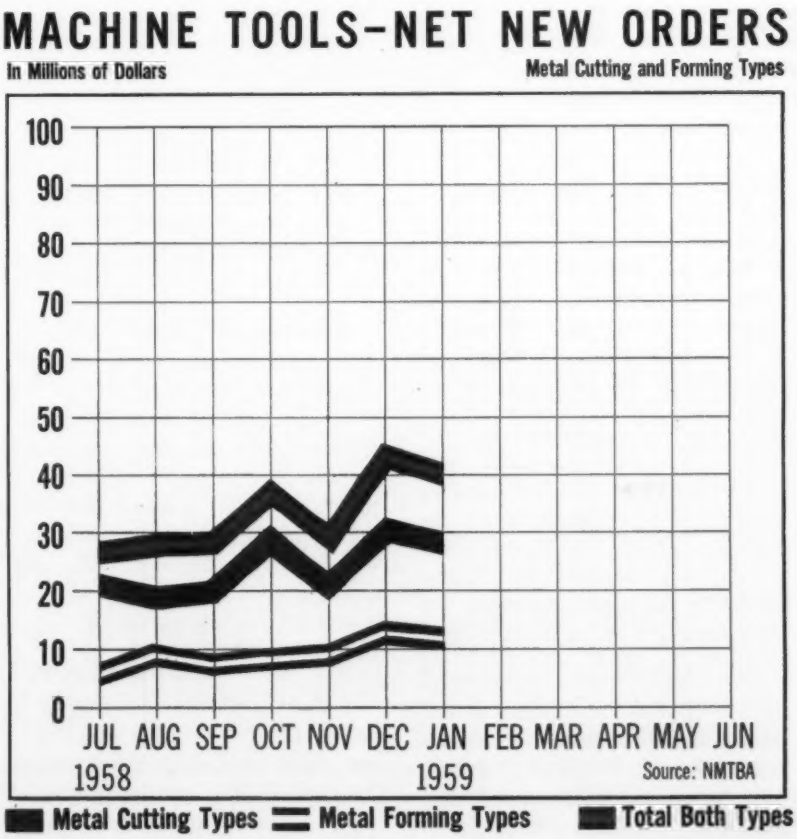
Numerical control has already brought impressive savings in time and money to hundreds of aircraft-part machining jobs. But APT should make the record even more impressive by eliminating the biggest bottleneck still remaining. That's the need—with every new part—for a man to spend long hours with a desk computer, calculating the numerical data for the punched tape which puts the machine tool through its paces.

Machine "Reads" Directions — APT skips this manual programming phase by using a large digital computer to calculate the needed data. Now the man need only study the part drawing and write down an outline of the machining sequence he wants the tool to follow. In writing this outline, he uses the APT vocabulary.

These sequence directions are punched on cards which are used to feed the problem to the general purpose digital computer. Ordinarily, such a computer could not understand these word directions. But by pre-feeding the computer with still another master deck of program cards, it is able to comprehend the word commands, and calculate whatever problems they pose. The answers to these rapid calculations provide the numerical data for the punched tape which eventually directs the machine tool.

Tool Orders Slip

January net new orders for machine tools slipped below the December level but stayed above the mark reached in any other month last year. Total net new orders for metal cutting and forming machines were $40.2 million compared to $26.9 million in the same month a year ago.



INDUSTRIAL BRIEFS

Heading East — Wheeling Corrugating Co., will build a new $½ million corrugated metal culvert pipe plant and bituminous coating facilities at Southampton, Pa. The operation will be part of the company's Philadelphia branch.

Shaky Subject — A new firm, Unholtz-Dickie Corp., has been formed in Hamden, Conn., to provide professional engineering services covering vibration problems. These include fatigue, shock, and shake testing, design to withstand dynamic loads, suspension systems, noise control, and equipment and controls associated with dynamic testing.

Habla Espanol? — Ferro Corp., Cleveland, will open a new affiliate in Bilbao, Spain. To be known as Ferro Enamel Espanola, it will be capitalized for about $½ million. It will produce porcelain enamel and glaze frits and inorganic colors for sale throughout Spain.

Reaching Out—The Associated Steel Fabricators of Detroit is now known as the Great Lakes Fabricators Assn. The organization was expanded to include concerns in the Ohio-Indiana areas as well as Michigan.

Finishing Research — Techline Div. of Wheelabrator Corp., has opened a new chemical laboratory at Vicksburg, Mich., with facilities for research and development in barrel finishing compounds. Mason Atkins was named chief chemist.

Founders Move—The Malleable Founders Society headquarters are now located at 781 Union Commerce Bldg., Cleveland 14, O. The Society is the trade association for the malleable iron castings industry.

New Nail Mill — Continental Steel Corp.'s new nail mill is in full operation. Big feature of the mill is two Ransohoff Cleaning Lines. The warehouse is insulated and heated to keep nails moisture-free.

It's Automatic — A fully automatic aluminum container for home dispensing of beverages in case quantities is under development by Reynolds Metals Co. Reynolds has purchased all rights from inventor J. H. Bull, who has joined the company as a consultant in developing and marketing the container. Trademark will be "Tapper."

Name Change—The Denver engineering facilities of Ramo-Wooldridge Div. of Thompson Ramo-Wooldridge Inc., Los Angeles, are now called Denver Laboratories.

Tech Head—G. H. Schippereit has been appointed technical advisor at Battelle Memorial Institute, Columbus, O. Mr. Schippereit has been a member of the research center's staff for more than 10 years.

Room for Expansion — U. S. Steel Supply Div. has bought land for new steel warehouses in Memphis, Tenn., and in Texas. The service centers will be coordinated with the other 18 centers in the Division's network.

Dual Election—Robert M. Buck, president and general manager, The Bryant Industrial Products Corp., Cleveland, has been elected director for a 3-year term of The Industrial Heating Equipment Assn. He also was elected chairman of the Combustion Equipment Div. of the Assn.

Expansion in Canada—Cleaver-Brooks, manufacturers of package boilers, has completed its $900,000 Canadian plant in Stratford, Ontario. The Canadian operation is part of a $2 million expansion program which included doubling the company's eastern manufacturing center at Lebanon, Pa., and modernization of its plants in Milwaukee.

New Plastics Source — Cadillac Plastic & Chemical Co., is manufacturing sheets, rods, tubes, strips, and slabs in Teflon T-F-E resin. The operation is housed in a new $1¼ million building in Warren, Mich. The company has been appointed a national distributor for Fluorglas Teflon-coated glass fabrics, manufactured by Dodge Fibers Corp.

Missile Groundwork — Federal Pacific Electric Co., Newark, N. J., has contracts to provide electrical equipment valued at $½ million for missile sites at Vandenberg Air Force Base, Lompoc, Calif., and for navy launching facilities in the same area at Point Arguello.

New Bauxite Ship—The "Revere," second bauxite ore carrier built for Ormet Corp., was launched in Hamburg, Germany. It was christened by Mrs. J. M. Kennedy, wife of the chairman of the board, Revere Copper & Brass Inc.

Material Handling Showman—R. F. Moody has been appointed 1959 chairman of the Expositions Committee of The Material Handling Institute, Inc.

DSC PORTSMOUTH LPR COILS

Each Coil a Self-Contained Cost-Reduction Program, Including a Built-in Materials Expediting System to Help Bright Wire Fabricators Reduce Man-Hour Costs.

How a Customer's Complaint Only Served to Re-emphasize LPR Advantages

ORDER ACCEPTED UNDER PROTEST — Our wire mill accepted an order recently "under protest." It was for a carload of **.500"** Bright Wire in **2,000 pound** LPR's. Why the protest? They were skeptical of the capacity of our equipment at the time for such heavy wire in such big bundles.

TROUBLE — Sure enough, their misgivings proved correct. To complete the order, therefore, we had to include a sprinkling of "light" coils. These weren't so "light" either. Actually they averaged 1,545 pounds per coil, *but they were short of 2,000 pounds.*

THEN CAME THE STORM — On arrival of the shipment the customer complained righteously. Here's the gist of the "lecture" a DSC "Rep" received:

- "You know darn well our production standards have been set up for 2,000 pound coils."
- " 'Light' coils like these are bound to jump our downtime, lose us production and raise Cain with our costs."
- "What's more, with the 2,000 pound coils we cut our previous coil remnant scrap losses by 86%. With these 'light' coils those savings will go down the drain."
- "So don't ever forget—*we just can't tolerate 'light' coils.*"

POSTSCRIPT — *Heavy enough equipment has now been installed so we can properly produce 2,000 pound LPR's of ½" Bright Wire.*

A BIT OF BACKGROUND — Up to 1957 this customer had used nothing but 300 pound coils. That year, after resolute resistance, they agreed to switch to 2,000 pound LPR's. (Their top size initially was .375", later increased to .4375", and again recently to .500".)

THE LESSON — You won't "tolerate" traditional weight coils (under 600 pounds) either—once you begin using DSC Bright Wire in LPR coils (available in single length bundles up to about 4,200 pounds depending on carbon content and wire size).

IT'S YOUR MOVE!

How about a taste of LPR economy and efficiency on your own Bright Wire jobs? Quick action and complete information yours from your nearest DSC "Rep" office or from Sales Headquarters at Detroit 9, Michigan.

Customer Satisfaction Is Our No. 1 Job

DETROIT STEEL CORPORATION
GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:
Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio, Dayton, Ohio, Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Houston, Texas, Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York City, Rochester, N. Y., St. Louis, Toledo, Worcester, Mass.

The PROOF of DSC STEEL is in its PERFORMANCE on Your Job

DSC PRODUCTS: Coke . . . Coal Chemicals . . . Pig Iron . . . Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods . . . HR and CR Sheet and Strip . . . Flat CR Spring Steel . . . Manufacturers' and H.C. Specialty Wire . . . Welded Wire Fabric

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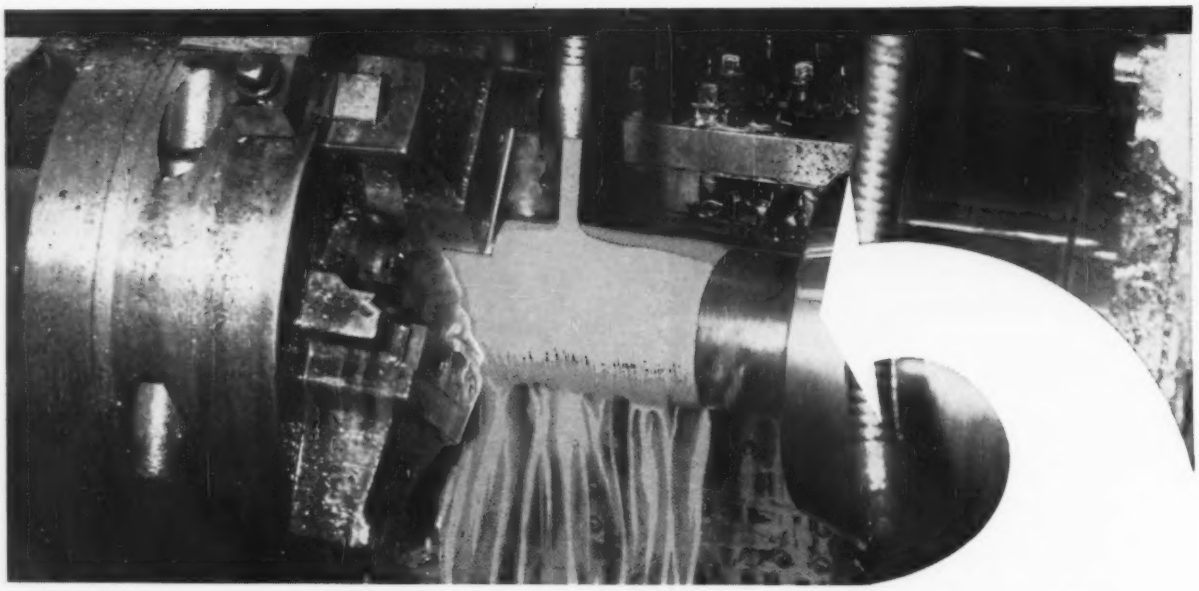
a "NEW LEAF" in coolants... New 100% Chemi-Cool HOCUT cools... lubricates... prevents rust... stays mint-fresh for life!



No other cutting fluid does so much, so well, for so long... as NEW HOCUT 237

Permanently odor-free—Needs no "additive" to stay clear and fresh-smelling for life. Cannot turn rancid or harm hands. Keeps your shop clean and your operators happy.

Cools work and tools quickly—Faster cooling speeds machining time—prevents welding and chip build-up, and increases tool life.

A lubricant that works—The secret is in new synthetic high-molecular-weight lubricity additive—which, in plain language, means the needed lubrication advantages of a "soluble oil"—with none of the disadvantages.

Protects tools and work from rust—Work coming off the machine is coated with a two-stage rust preventive. Tools, ways, slides and bearings get permanent protection.

Best for economy—Initial cost is only a few pennies per gallon, in the machine. Expense of clogged filters is practically eliminated and filtration speeded up. HOCUT can be used and re-used for months and disposal is never a problem.

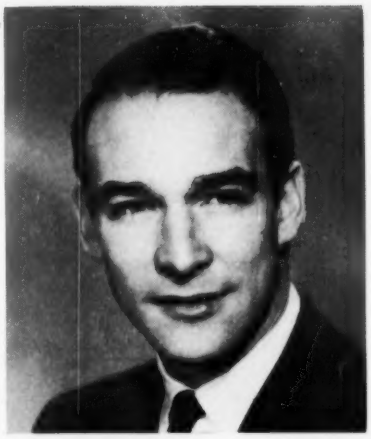
For positive proof of new HOCUT's unique properties and economy—in your own plant—call your Houghton Man today. Or write: E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

HOCUT 237... *a product of*

E. F. HOUGHTON & CO.

PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO • TORONTO

Ready to give you on-the-job service



H. J. Siekmann, promoted to manager, market development and research, Metallurgical Products Dept., General Electric Co., Detroit.

Sam DuPree, elected to the board of directors, The Goodyear Tire & Rubber Co., Akron, O.

U. R. Gress, appointed general assistant to the vice president, foreign operations and public relations, Rockwell - Standard Corp., Coraopolis, Pa.

M. E. Carroll, elected vice president, marketing, Minneapolis-Moline Co., Hopkins, Minn.; **R. R. Hipwell,** named sales manager, Industrial and OEM Division.

W. V. Shakespeare, elected a vice president, Cincinnati Rubber Mfg. Co., Cincinnati, O., a division of Thor Power Tool Co., Aurora, Ill.

A. J. Breitenstein, appointed asst. vice president, raw materials, U. S. Steel Corp.

Benson Carlin, appointed vice president and executive director, Circo Ultrasonic Corp., newly formed subsidiary of Circo Equipment Co., Clark, N. J.

P. R. Gross, appointed treasurer, United States Steel Supply Div., U. S. Steel Corp.

Richard Jakobi, appointed conveyor systems engineering specialist, Conveyor Dept., The Oliver Corp., A. B. Farquhar Div., York, Pa.

The following appointments are in the Operating Dept. at Republic Steel Corp.'s Chicago steel plant. **T. A. Pope,** named asst. superintendent, Seamless Tube Mill and **J. P. Sullivan,** appointed asst. to the superintendent, Openhearth and Electric Furnace Dept.

E. J. Barcal, Jr., named midwestern territory manager, Alloy Tube Div., The Carpenter Steel Co., Union, N. J.

T. P. Bronco, appointed assistant to the general manager, sales activities, Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Laurent Oppenheim, Jr., elected a director and appointed vice president, finance, Hanson-Van Winkle-Munning Co., Matawan, N. J.

J. N. Ludwig, Jr., appointed supervisor, metallurgical services, The International Nickel Co., Inc., with headquarters in Pittsburgh.

R. A. Manogue, promoted to product manager, pumps and controls division, Denison Engineering Div., American Brake Shoe Co., Columbus, O.

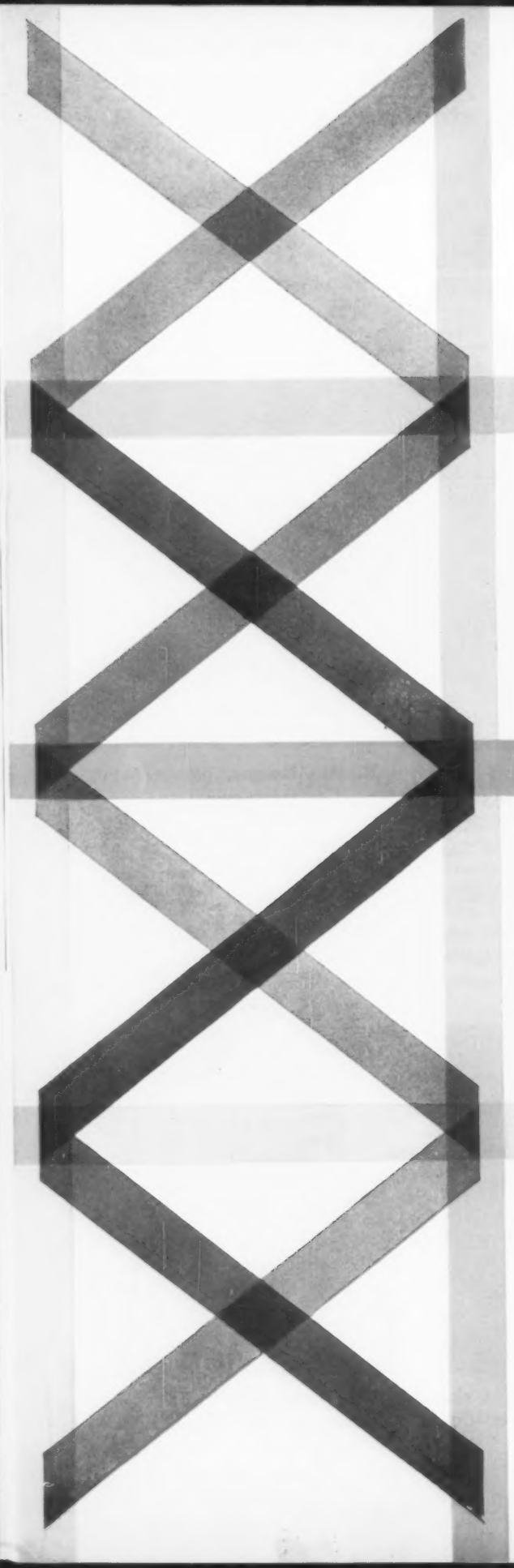
D. W. Kaufmann, appointed manager, tool steel sales, Crucible Steel Co. of America; **A. H. Lewis,** named assistant to the works man-

(Continued on P. 68)

J. J. Jaeger, named executive vice president, Pratt & Whitney Co., West Hartford, Conn.

H. J. Fredericks, named a vice president, Pratt & Whitney Co., West Hartford, Conn.

E. J. Shages, named vice president, manufacturing, all operations, Pratt & Whitney Co.



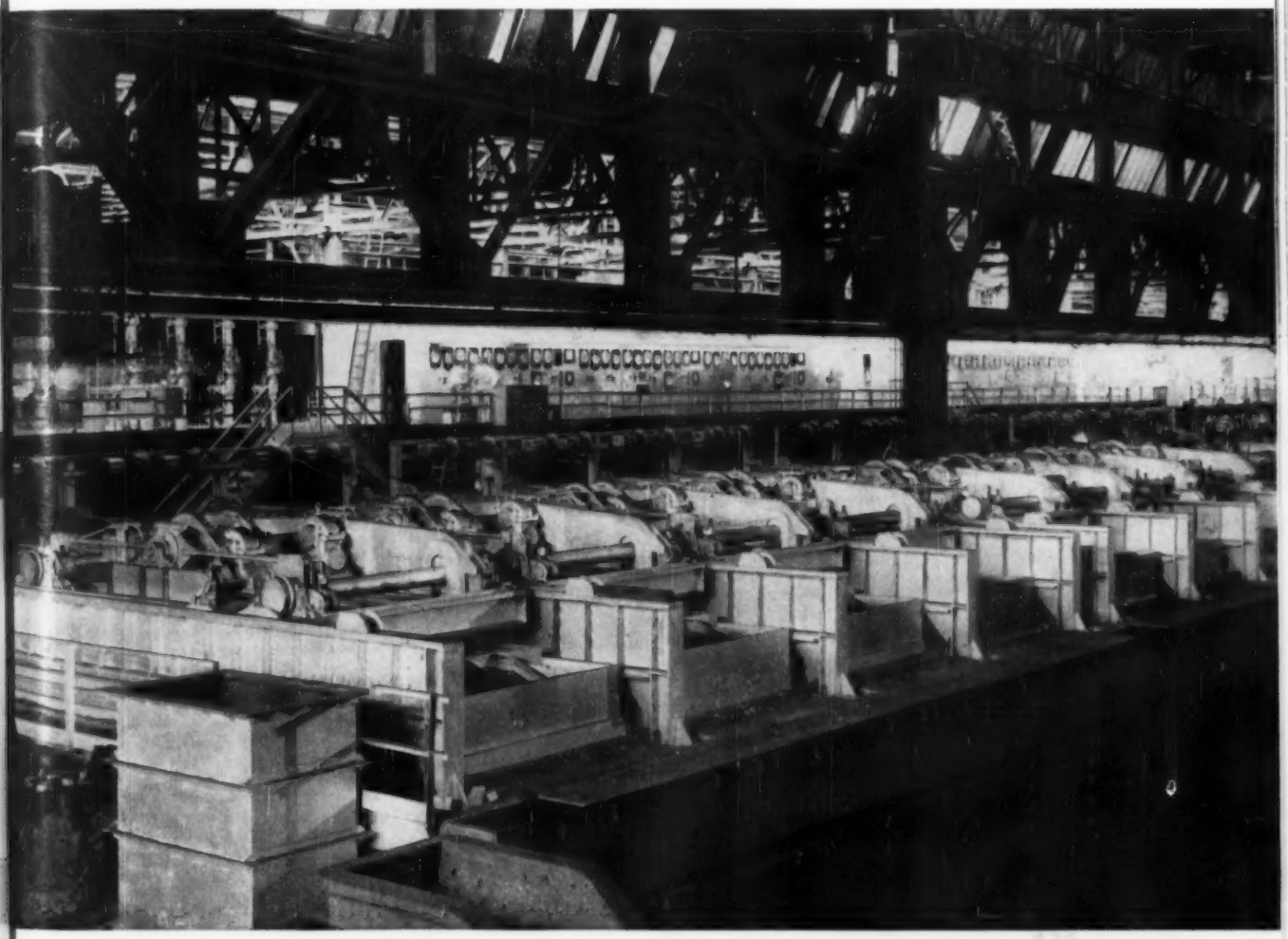
The pit nobody liked...

except our customers

This is of course our one-way fired soaking pit . . . fired from the top.

The location of the burner is only one of the features responsible for its enthusiastic acceptance. Most important however are the 30 years of experience and refinements which we have built into the pit since we first introduced it.

That is why, today, it is the pit everybody respects . . . especially our customers.



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Worldwide engineering and manufacturing facilities through associates in: Australia • Belgium • France Germany • Great Britain • Italy • Japan

Surface

(Continued from P. 65)
ager, Sanderson-Halcomb plant in Syracuse, N. Y.

W. F. Baker, promoted to regional manager, Treasury Dept., U. S. Steel Corp., Chicago.

W. M. Ewing, appointed vice president and general manager, Capitol Foundry Div., Phoenix, Ariz., National Malleable & Steel Castings Co.

D. F. Stock, named manager, new Garber Research Center of Harbison-Walker Refractories Co., Pittsburgh; **D. F. King,** named asst. manager.

C. E. Snyder, named manager, heater sales, Engineering Works Div., Dravo Corp., Pittsburgh.

I. W. Gower, appointed director, research, Botfield Refractories Co., Philadelphia.

K. L. Selby, appointed vice president and general manager, Transportation Products Div., National Malleable & Steel Castings Co.

L. G. Blackmon, named general manager, Sharon Works, National Malleable & Steel Castings Co.

D. C. Graham, appointed asst. sales manager, brass mill products, Bridgeport Brass Co., Bridgeport. Conn.; **R. W. Frederick,** named assistant to the president; **P. E. Bush,** sales manager, Condenser Tube Div.; **William Brown,** sales manager, Plumbing and Heating Div.; **K. S. Case,** asst. sales manager, Plumbing and Heating Div.; **D. R. Fulton, Jr.,** named district manager, Tampa, Fla., sales district.

J. L. Daniell, elected president, Green River Steel Corp., Owensboro, Ky.

W. H. Hall, appointed asst. general superintendent, U. S. Steel Corp.'s Gary Plant of the National Tube Division.

T. D. Ernst, appointed product manager, engineered rubber prod-

(Continued on P. 70)

ACCEPT NO SUBSTITUTE

MEEHANITE CASTINGS ARE MADE ONLY BY MEEHANITE FOUNDRIES

The American Laundry Machinery Co., Rochester, N. Y.
Atlas Foundry Co., Detroit, Mich.
Banner Iron Works, St. Louis, Mo.
Barnett Foundry & Machine Co., Irvington, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
E. W. Bliss Co., Canton and Toledo, Ohio and Hastings, Mich.
Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, Ohio
Compton Foundry, Compton, Calif.
Continental Gin Co., Birmingham, Ala.
The Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co., Portland, Ore.
Dayton Casting Co., Dayton, Ohio
Empire Pattern & Foundry Co., Tulsa, Okla. and Bonham, Texas
Florence Pipe Foundry & Machine Co., Florence, N. J.
Fulton Foundry & Machines Co., Inc., Cleveland, Ohio
General Foundry & Mfg. Co., Flint, Mich.
Georgia Iron Works, Augusta, Ga.
Greenlee Foundries, Inc., Chicago, Ill.
The Hamilton Foundry & Machine Co., Hamilton, Ohio
Hardinge Company, Inc., New York, N. Y.
Hardinge Manufacturing Co., York, Pa.
Johnstone Foundries, Inc., Grove City, Pa.
Kanawha Manufacturing Co., Charleston, W. Va.
Kennedy Van Saun Mfg. & Eng. Corp., Danville, Pa.
Koehring Co., Milwaukee, Wis.
Lincoln Foundry Corp., Los Angeles, Calif.
Nordberg Manufacturing Co., Milwaukee, Wis. and St. Louis, Mo.
Palmyra Foundry Co., Inc., Palmyra, N. J.
The Henry Perkins Co., Bridgewater, Mass.
Pohlman Foundry Co., Inc., Buffalo, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sonith Foundries of FMC, Indianapolis, Ind.
Standard Foundry Co., Worcester, Mass.
The Stearns-Roger Mfg. Co., Denver, Colo.
Vulcan Foundry Co., Oakland, Calif.
Washington Iron Works, Seattle, Wash.
Dorr-Oliver-Long, Ltd., Orillia, Ontario
Hartley Foundry Div., London Concrete Machinery Co., Ltd., Brantford, Ontario
Otis Elevator Co., Ltd., Hamilton, Ontario

WRITE FOR YOUR FREE SINGLE COPY

Bulletin 23 — "Meehanite® — The Metal For Permanent Molds."

Write today to Meehanite Metal Corporation, Department IA, 714 North Avenue, New Rochelle 23, N. Y.

MEEHANITE®

This permanent mold for making 650 lbs. aluminum castings may well be the largest ever made. Cast in type GA, Meehanite metal by Fulton Foundry & Machine Co., Inc. of Cleveland, Ohio, it weighs 25-tons assembled.

Meehanite permanent molds offer resistance to heat checking and distortion from thermal shock.

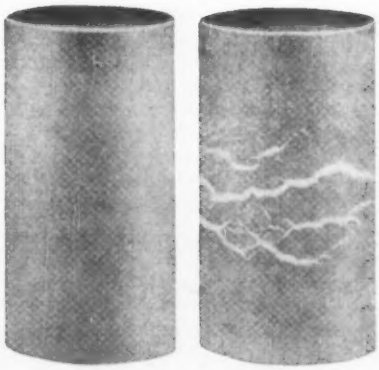
Premature cracking or disintegration of surface is a serious problem to the users of permanent molds. Severe service conditions demand the selection of a metal with a dense close-grained structure which maintains dimensional accuracy and resists the disastrous effects of thermal shock.

Meehanite metal has the ability to more than meet these requirements and is used extensively for permanent molds in the production of both ferrous and non ferrous castings, glass, plastics and other materials. The huge mold illustrated is proof of the confidence placed in Meehanite.®

The chief advantage of a Meehanite mold is consistent uniformity of structure throughout the casting. Meehanite's dense, stabilized structure resists thermal shock, insures freedom from distortion and dimensional changes. Easily machined, it provides the smooth, highly polished surface so essential to good finish and long production life.

Meehanite molds can be cast closely to shape to reduce machining operations. Also, they may be heat treated or flame hardened where high hardness is required.

Write for free literature: Bulletin 23 — "Meehanite® — The Metal For Permanent Molds."



The block on the right reveals what happens when an ordinary permanent mold material is suddenly heated and cooled. The Meehanite block on the left, given same test, shows complete freedom from surface cracking.

MEEHANITE BRIDGES THE GAP BETWEEN CAST IRON AND STEEL®

MEEHANITE METAL

MEEHANITE METAL CORPORATION, NEW ROCHELLE, NEW YORK

No. 3 in a series of Hoerner Packaging Experts

THIS IS THE HOERNER SPECIALIST FOR PACKAGING SQUASHY THINGS

Bruisable products present a challenge to Hoerner Packaging experts. The squishier the better! They've learned that ingenious use of quality corrugated board can ship the most tender-skinned things without a damaging nudge. If you pack or process squashy things, contact the Hoerner office or plant nearest you.

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(Continued from P. 68)

ucts, Passaic, N. J., plant, United States Rubber Co.; **J. J. Cullen,** appointed asst. product manager.

F. G. Outcalt, appointed sales manager, Linde Dept., Union Carbide International Co., Div. of Union Carbide Corp.

D. J. Murray, elected president, Mahoning Valley Steel Co., Niles, O., wholly owned affiliate of General Electric.

R. J. Ulvestad, named district sales manager, Permaglas Div., A. O. Smith Corp., Kankakee, Ill.

OBITUARIES

L. A. Behrendt, 62, vice president, Joseph Dixon Crucible Co., Jersey City, N. J.

Merrill Good, 47, manager, electrode sales, Hobart Brothers Co., Troy, O.

H. F. Vogt, 79, board member and former officer, Cutler-Hammer Inc., Milwaukee.

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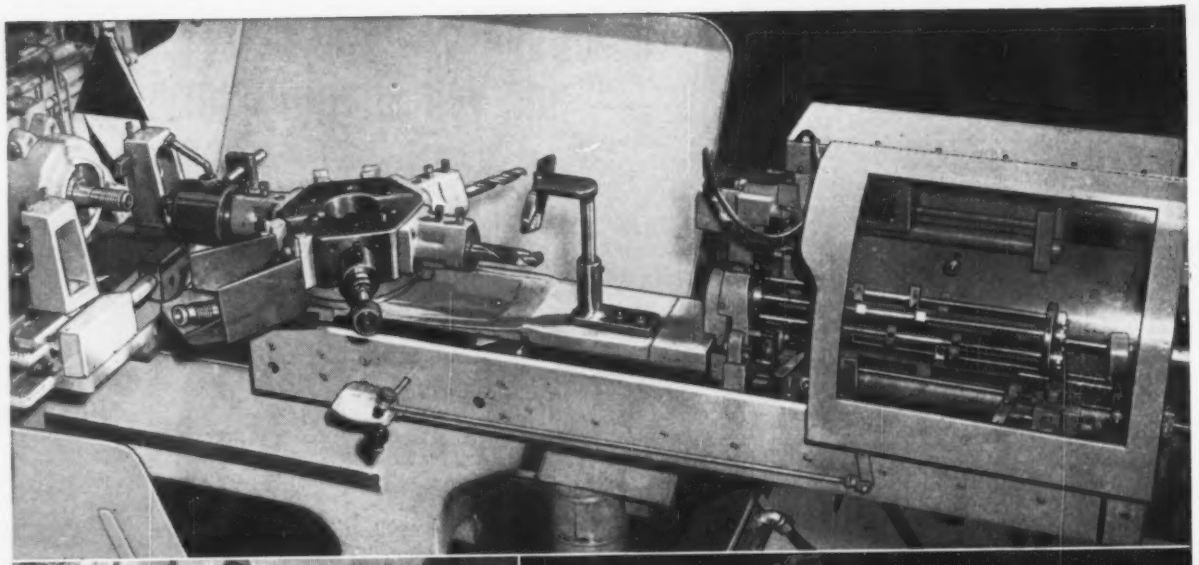

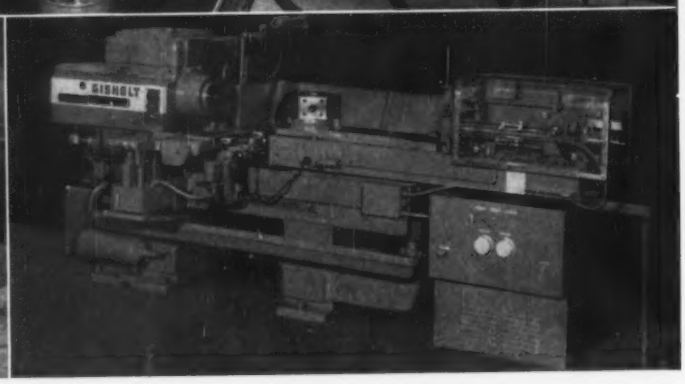

250% Production Increase with this setup

Gets full automation on small job-lot production runs using hydraulic drive on Gisholt Ram Type Turret Lathe

Floor-to-floor time on the job shown here—a threaded collar 3⅛″ long with 1¹¹⁄₁₆″ diam.—was cut from 8.1 minutes (with hand operation) to just 3.25 minutes. All operations and machine functions are automatically controlled with the Lynn Hydraulic Drive Unit on a Gisholt Ram Type Turret Lathe.

Here's how the finished workpiece is completely machined from bar stock in one fast, automatic operation: The stock is fed pneumatically against a turret stop, chucked, start-drilled, then finish-bored with a large drill. The hydraulic drive backs the drill out automatically to clear the chips, then rapid traverses back to where it left off before dropping into feed to resume drilling. Spindle speed automatically decreases as tools on the front cross slide form the O.D., drops into lower speed as O.D. is threaded, and into another low speed as radii are formed on the finished part and on the end of the bar stock. A tool on the rear cross slide cuts off the finished part and the job is done in record time.

With its massive design, reserve power and extra spindle speeds, the new Gisholt MASTERLINE Ram Type Turret Lathe is particularly adaptable to complete automatic operation with Lynn Hydraulic Drive. Contact your Gisholt Representative. He has the complete facts—and his wide experience may point the way to more profitable operation for you.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

4-TON ESCO PUMP CASTINGS ON WORLD'S LARGEST "CANNED" PUMPS

...RESIST WATER CORROSION AT HIGH PRESSURES AND TEMPERATURES

Four mammoth Westinghouse "canned" motor pumps with *ESCO* volutes have been installed recently in the nation's first full-scale atomic electric generating plant at Shippingsport, Pennsylvania. These 1250 h.p. giants can pump 18,300 gallons of radioactive water coolant per minute at approximately 2000 psi at up to 500 degrees F.

The pump housings or "volutes" were cast by *ESCO* in Alloy 40-S (ACI-CF8), to withstand the severe corrosive effects of water at high temperatures and pressures. Castings were radiographed to ASTM specification E71, Class II and 100% dye-penetrant inspected.

Casting specifications and inspection requirements for nuclear application are thoroughly understood at *ESCO*. Equipped with the finest facilities and the technical know-how, *ESCO* welcomes the toughest casting assignments. Ask your nearest *ESCO* representative for details or write direct.

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Offices in Most Principal Cities
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MAGNAFLUX

whether you produce

a few big parts per month . . .

or

thousands of small parts per hour . . .

(or any volume or size between)

ZYGLO

the simplest, fully reliable test to

find cracks

is usually MAGNAFLUX or ZYGLO

These two great test systems have earned an acceptance in industry that is unique but fully understandable.

Magnaflux Magnetic Particle for magnetic metals (Fluorescent with Magnaglo and black light) . . . Zyglo Fluorescent Penetrant for non-magnetics (and some magnetics, too)

Both offer near-absolute reliability in their recommended uses. Their sensitivity is controllable, and is such that they can safely be used to find any crack that you *need* to find — with you and/or your customer writing the "specs." This in itself can save you much trouble and cost. It avoids over-inspection and under-inspection, both!

Both Systems clearly reveal and mark defects right on the part. Neither require negatives, detailed interpretation or inspection delay. Parts can be inspected at thousands of pieces an hour in fully automated Magnaflux or Zyglo Systems . . . often at tiny fractions of a cent per part. If you want permanent records on some parts, they are easy, by photography or transfer techniques.

Both Systems fit with minimum change into your present production set-up. Use at any stage from receiving, through all processing operations, to final inspection. (Naturally, the earlier the defects are found, the less it costs to find the cause or salvage the parts.)

Many companies have reported hundred-fold savings, over the low initial cost of Magnaflux and Zyglo. Your specific savings can best be estimated by a Magnaflux Engineer. But whatever you make, if you are now taking any reasonable care not to ship or assemble cracked parts, Magnaflux or Zyglo Testing should save you substantial amounts.

And in any case, you'll want the latest data on how these Systems, backed by 30 years of Magnaflux Corporation development, are being continuously made more effective—to meet the needs of new technology in the metal production and fabrication fields. Write for bulletin "Lower Manufacturing Costs" or descriptive booklets on Magnaflux or Zyglo.

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THE HALLMARK OF *Quality* IN NONDESTRUCTIVE TEST SYSTEMS

How To Get More For Your Metalworking Dollar

Industrial Adhesives

IN THIS FEATURE

Adhesives will bond almost any material you can name. The list includes aluminum, steel, stainless steel, brass, magnesium, titanium and copper, in addition to rubber, plastic, glass and others.

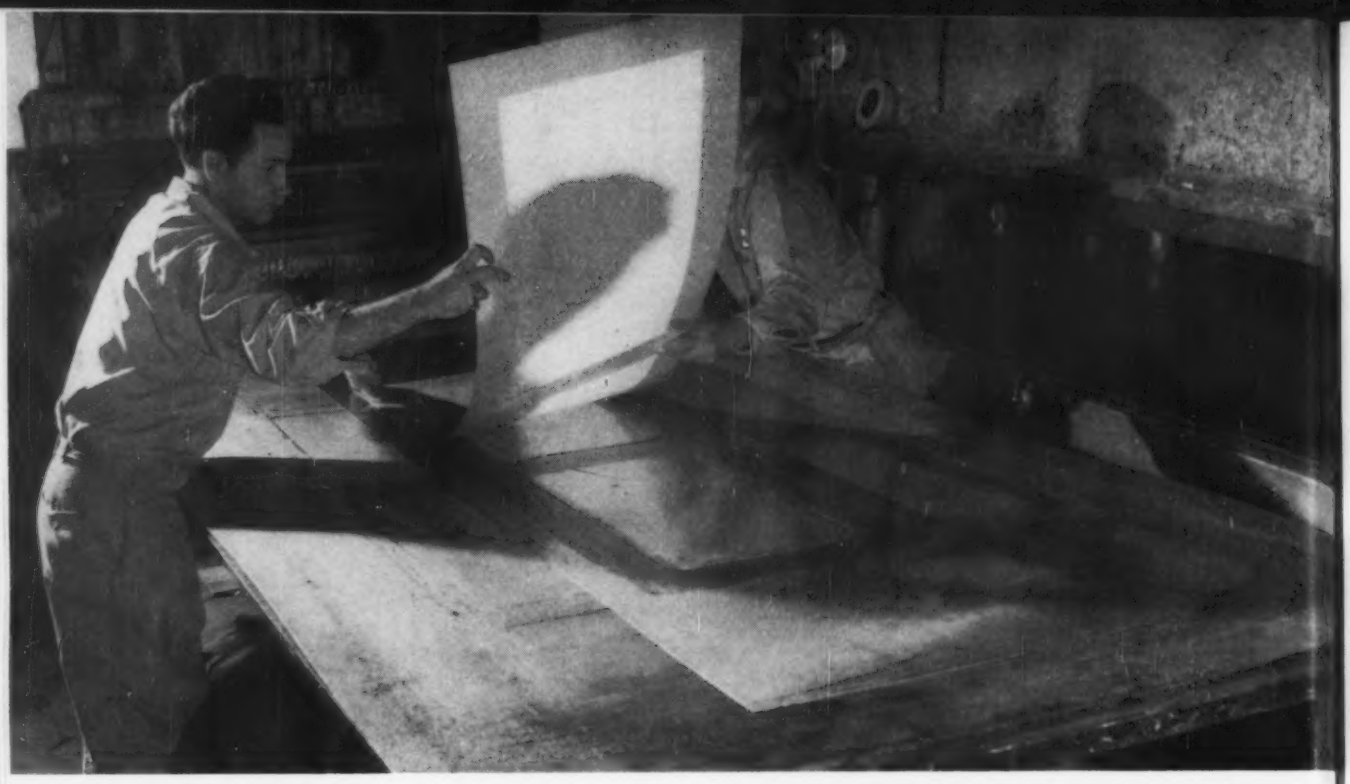
The materials can be joined to themselves or to each other, in virtually any combination of thickness and type.

Moreover, today's adhesives do a lot more than just stick things together. Structural adhesive bonding now stands side by side with mechanical and fusion methods of joining various metals.

Along with its rapidly growing use in modern metalworking has come an array of new adhesives. Some are tailored to specific jobs; others cover a range of many applications.

You needn't be an adhesives expert to use these versatile materials. Nor is it necessary to know all about the thousands of sub-types on the market; rely on the suppliers' specialists to guide you.

But do get acquainted with the broad classes. Then you can better decide where they might fit into your work.



HOLDS AND SEALS: Adhesives in dry-film form are used in place of rivets by Strick Trailer to bond reinforced-polyester skylights to aluminum roofs of trailers. Photo courtesy of Rubber & Asbestos Corp.

Base Choice on Service

Weigh the benefits that adhesives offer.

Review the properties of each main adhesives group.

But base your selection only on a performance-type spec.

▪ Modern adhesives constitute a fast, economical way to hold, join and assemble things. In many cases, adhesive bonding is the only practical method of fastening. Even where other means might be or have been used, adhesives often have special advantages—high strength, lower cost, less weight or greater freedom of design.

Adhesives make it possible to join dissimilar metals with a minimum of bi-metallic corrosion. They also minimize corrosion from entrapment of moisture between surfaces, since the adhesive acts as a continuous barrier between the two metals.

Assembly of heavy gage metal to thin sheet presents no problem when they're adhesive bonded. The same holds true where metals must be joined to non-metals.

Distributes the Load — Continuous bonds produced by adhesives distribute stress loads evenly over the entire joined area. This eliminates local stress concentrations and produces greater strength and rigidity. It often does away with stiffening members, and permits use of lighter gage materials or smaller overall size.

Adhesives impart flexibility to the joint and thus provide good fatigue properties. This is due to the adhesive's stress-distributing ability, and the fact that most adhesives absorb or at least dampen vibration and shock. In many cases, adhesive-bonded joints have up to 10 times the fatigue resistance of riveted joints.

Because adhesive bonding forms continuous contact between mating surfaces, it seals as well as bonds in a single operation. This eliminates the time and cost of separate sealing work, and permits sealing of joints where it might not otherwise be posssible.

Insulates, Too—A good bond is usually impervious to both liquids and gases. Many adhesives also act as electrical insulation.

Adhesive bonding forms smooth, protrusion-free joints. This improves aerodynamics of exterior surfaces, enhances product appearance, aids in styling, and eliminates gaps, bulges or external projections. As an added benefit, it does away with grinding and filling operations.

Adhesives maintain soundness of structural members. There's no need for holes or countersinking to provide a flush surface. Nor do they require excessive heat, so there's no chance of altering properties of the metal, or having to perform subsequent heat treatment.

Whether or not adhesive bonding will be more economical depends on the size and nature of the part, and the relative cost of other fastening methods. There are hundreds of instances where adhesives have made for big savings, few indeed where they had to be used despite somewhat higher costs.

Don't Overbuy — Like other means of attachment, adhesives have their spheres of superiority and areas of questionable value. Assuming adhesive bonding fits a particular application, the next problem is which adhesive to use.

The right adhesive for any job is the one that provides an adequate bond at the lowest possible cost. This seems obvious. Yet, many users tend to choose the strongest one, regardless of their actual needs.

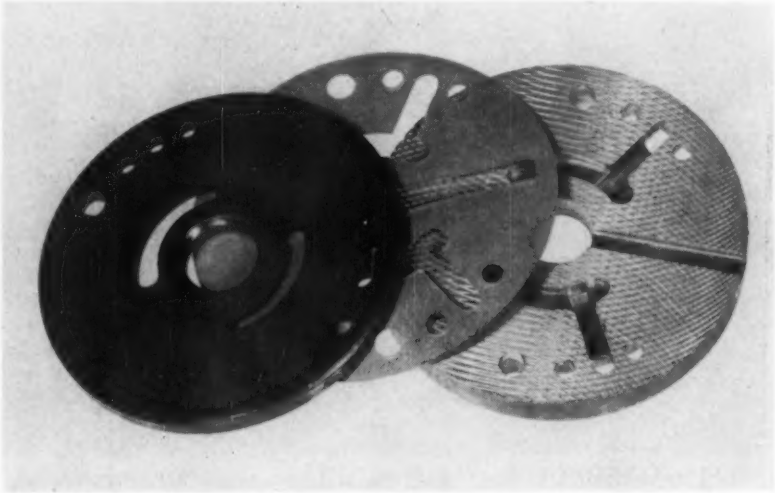
This tendency to overbuy often creates unrealistic specifications. There's no need to specify water resistance, for example, if moisture will never touch the adhesive. Nor is a high-strength adhesive needed to adhere weak material to a strong one, as in the case of bonding acoustical material to steel; an inexpensive, lower-strength cement would do just as well.

Not Only Strength—At the same time, don't measure an adhesive's fitness for a job in terms of strength alone. Short-term shear, tensile or peel tests determine immediate strength. But they can't prove an adhesive's ability to withstand static loads over long periods. What might seem the strongest adhesive in such tests may fail in service under low static loads.

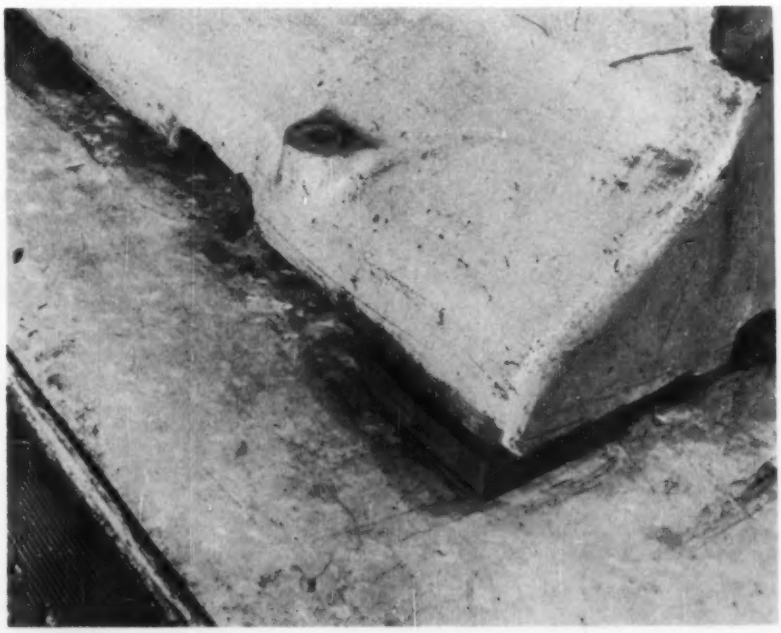
It's also unwise to build a specification around an adhesive just because it's currently giving you good service on another job. You may wind up paying a premium for unneeded qualities, or be kept from using a newer adhesive that'll do the new job better or at less cost.

The best kind of specification is one that includes only properties which are pertinent to the job. This type of performance spec gives reasonable latitude and helps your supplier's experts pinpoint your real needs.

Nor Cost Alone—On the other hand, too much emphasis on cost may result in getting a marginal adhesive. While it may do well under normal conditions, there's nothing in reserve for varied bonding tech-



DISSIMILAR METALS: Diecast aluminum plate bonded to powdered-iron disk cuts weight of portable air-tool rotor. 3-M Company photograph.



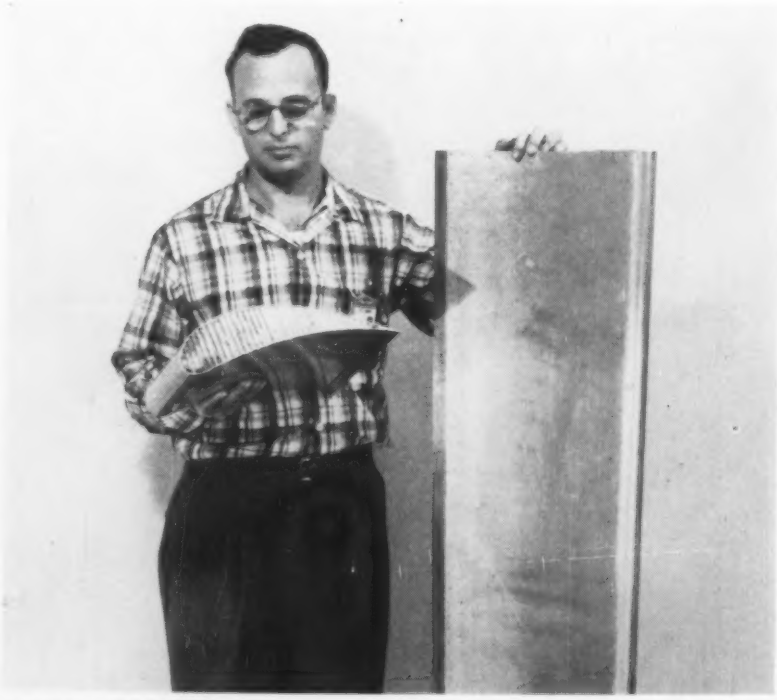
DAMPENS VIBRATION: Heavy mounting pads of rubber are first adhesive bonded to machine, then bonded securely to the floor. 3-M Co. photo.

nique, extra humidity or unusual service conditions. Such conditions are bound to arise. When they do, there'll be failures in the field.

Quite often, then, it's cheaper in the long run to pay a few cents more per gallon for that extra margin of safety. Rejects, field repairs and customer ill will can add up to many dollars.

Finally, don't overlook the design of parts to be bonded. An adhesive's performance can often be improved by small, inexpensive design changes. And, the right adhesive may permit simplification that'll also bring costs down.

SPEEDS ASSEMBLY: Both neoprene and epoxy-base adhesives are used in assembling AR-1 high fidelity loudspeakers. Rubber & Asbestos photo.



LIGHT BUT STRONG: Aircraft builders make wide use of bonded honeycomb structures, as in this flap for Douglas DC-8. Narmco, Inc., photo.

Sorting's a Problem — Adhesives are classified in all sorts of ways. People in the adhesives trade speak of them broadly according to end use: wood adhesives, metal-to-metal, metal-to-rubber, general purpose, and so on. Trouble is, one type may find use in several fields.

Another system separates them on the basis of how the bond is established; that is, as pressure-sensitive, heat-setting, solvent-release, chemically curing and the like.

The American Society for Testing Materials groups them according to the temperature required to effect a good bond: cold setting (below 68°F), room temperature setting (68° to 86°F), intermediate temperature setting (87° to 211°F), and hot setting (212°F and above).

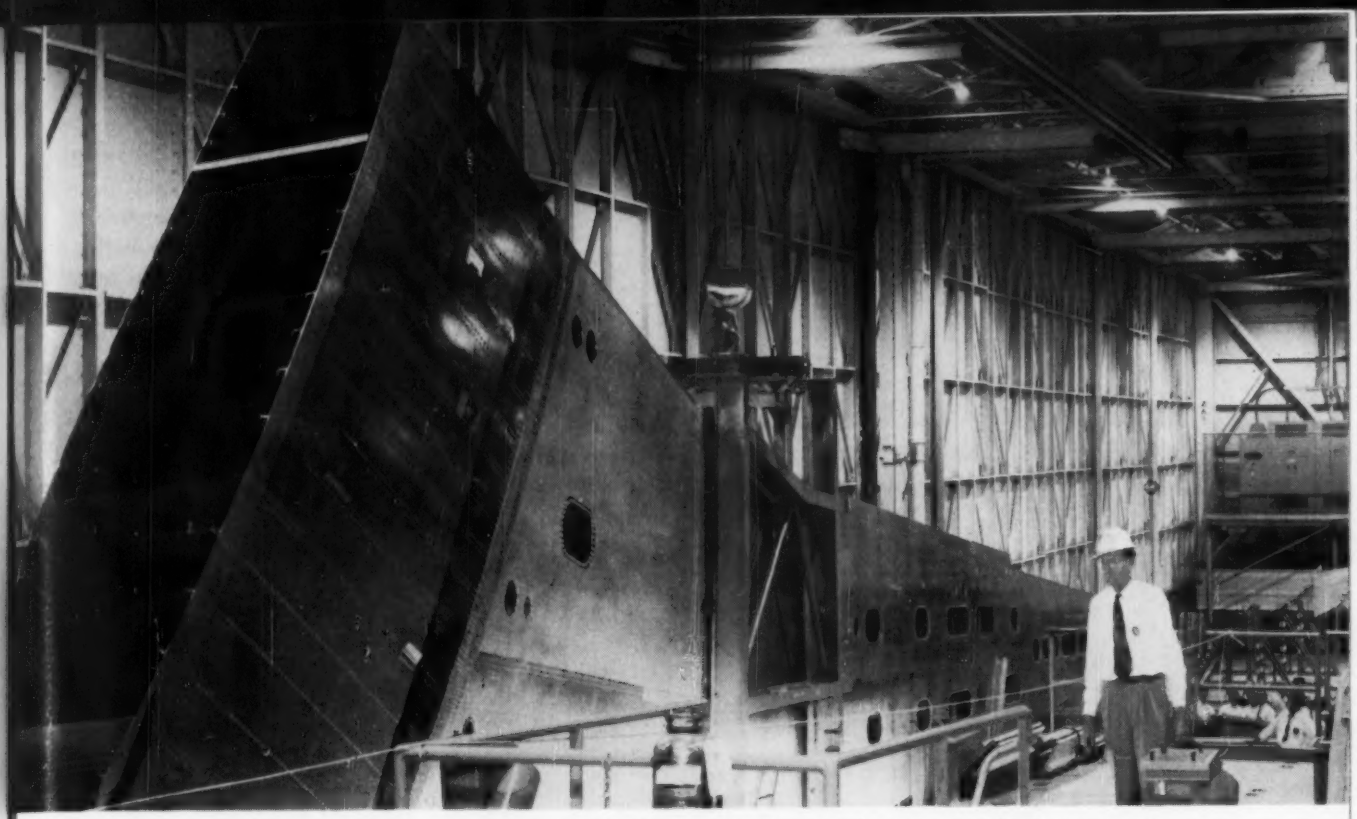
Still another method classifies them according to chemical type, in terms of the basic ingredient. A fifth approach says they're either thermosetting or thermoplastic—except that some types are both.

None Does the Job—The truth is, no one system is entirely adequate. There's a good bit of overlapping within them. No adhesive should be selected strictly on the strength of these general categories.

The way adhesives have advanced in recent years, we're no longer able to specify them in terms of generic type. The possible variations within any one basic group are almost infinite.

But the "chemical family" approach does serve a useful purpose; it boils down the general advantages of adhesive bonding into more specific ranges of properties—although they're still ranges.

Do study them—they'll help you decide whether and how adhesives may fit into your operations, give you a clearer picture of the whole. But where actual selection is concerned, stick to a performance-type spec. Base it on the materials to be joined, production methods which can or might be used, and service conditions or needs. Then, to get the right adhesive, consult the people who make them.



SECURES SKIN: Convair makes use of structural adhesive bonding on wing of new 880 jet transport.

Pick Thermosetting Adhesives For Strongest Bonds

These are the top performers, the adhesives that maintain highest bond strengths under extremes of service.

They're also the most costly, so consider them with care.

▪ As the name implies, thermosetting adhesives set or cure by application of heat and pressure. Once cured, they can't be reactivated or softened to any great extent by reheating. As a result, they have a wide useful-temperature range.

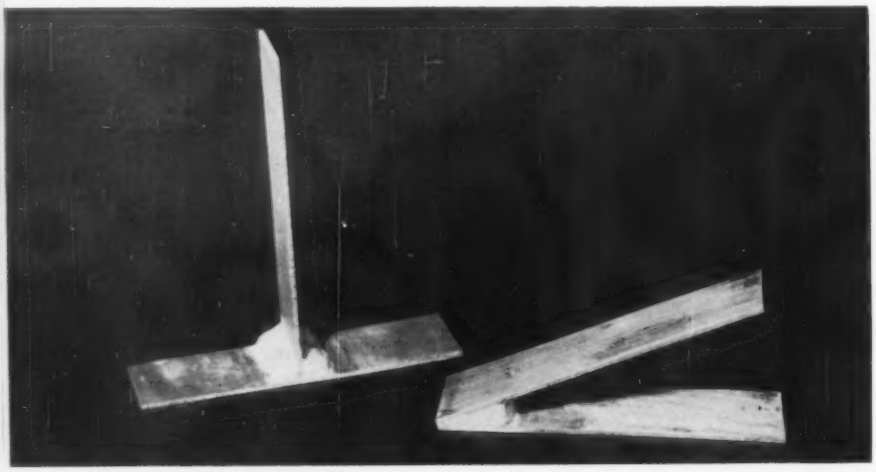
Most thermosetting adhesives become quite rigid when set. Little change occurs as temperature drops; but at extreme lows they tend toward brittleness. Although some creep occurs at high loadings and elevated temperatures, for practical purposes they can be considered rigid and unyielding.

Thermosetting adhesives provide high strength, durable bonds. They develop their strength and permanence partly by undergoing chemical change during cure, the rate of which increases with temperature. Assemblies must be kept under pressure during cure so the adhesive flows enough to fully and evenly wet the bonding surface.

Many Types—There are countless varieties of thermosetting adhesives, each with a specific set of properties. But those which find widest use in metalworking fall into five main classes: vinyl-modified phenolics, vinyl-butyral phenolics, neoprene - phenolics, nitrile - phenolics, and the epoxies. Even among these, it would be difficult to enumerate all the current variations.

Thermosetting adhesives are available as sprayable or brushable solvent solutions. They also come

TEFLON TO STEEL: One-part, 100-pct solids epoxy paste needs no additive, can be applied directly from the can. Rubber & Asbestos photo.



MAINTAINS ANGLE: One-part epoxy is thixotropic and so doesn't flow during cure; parts stay at any desired angle. Rubber & Asbestos photo.

in the relatively new form of supported and unsupported films.

Big Benefits — Film adhesives afford many design and economic advantages. They provide uniform thickness throughout the joint; controlled confinement to the immediate bonding area; clean bonding operations; and simple application procedures.

Because there are no solvents in film adhesives, they do away with waste, shrinkage, solvent hazards and drying problems.

When cured under pressure, film adhesives soften to a semi-fluid state and thoroughly wet the surfaces they contact. Continued heating of most films results in a cure that produces exceptionally high peel and bend strengths. Low-temperature and shear strengths are also good.

Epoxies

Epoxy-resin adhesives are naturals for metal-to-metal bonding and honeycomb sandwich construction. Their special advantages include exceptionally high shear strength, high rigidity, and excellent wetting of metal or glass surfaces. Also, since 100-pct solids epoxy adhesives don't give off volatile byproducts during cure, they're especially useful for bonding impervious surfaces.

One trait which makes them ideal for use with paper or aluminum honeycomb cores is their ability to self-fillet (form a bead on the edges of each cell in the honeycomb core). This increases contact area when the core is bonded to the facing.

Depending on the particular type used, epoxy-resin adhesives will produce overlap shear strengths of 2000 to 7000 psi. Heat-curing varieties have higher strengths than those which cure at room temperature. But strong bonds can be formed at room temperature with little or no pressure—an important factor in bonding large areas requiring difficult tooling, or materials with different coefficients of thermal expansion.

For High Temperatures—Some of the new epoxy adhesives have shear strengths in excess of 3500 psi at 250°F and more than 1000 psi at 500°F. At –67°F shear strengths will range from 500 to more than 5000 psi. Impact resistance is adequate.

Epoxy adhesives come as high-viscosity liquids, both two-part room-temperature chemically curing types and one-part heat-curing types, and as heavy pastes, powders and sticks. Two part epoxies require adding a chemical activator at the time of use; one-part types have a latent catalyst that calls for heat to trigger the chemical reaction.

Working life of one-part epoxies is unlimited. That of the two-part types, after mixing, ranges from 15 minutes to about 4 hours. Some may reach ultimate strength within 15 hours; usually, however, 4 to 6 days are needed to get maximum strength. Post-curing at 200°F for 30 to 60 minutes improves the strength.

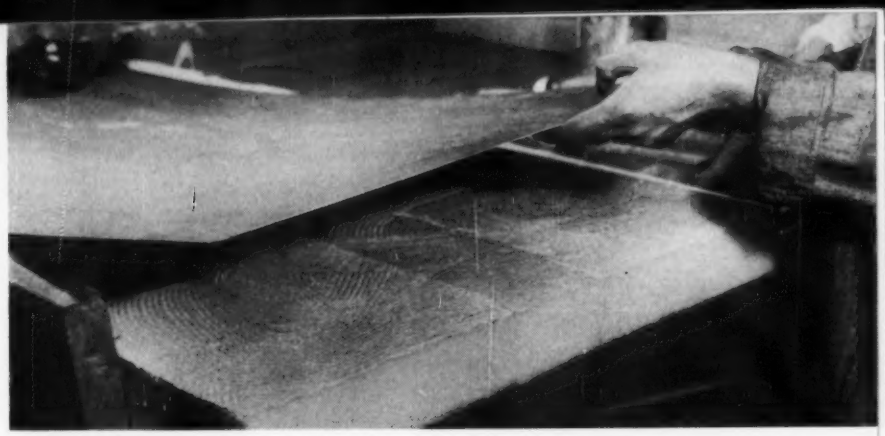
High Heat Speeds Cure—Cure time for one-part epoxy adhesives at 320° to 330°F will range from 60 to 90 minutes. At 500°F the cure time drops to about 1½ minutes. Care should be taken to prevent overcuring. Usually, exposing the bond to 350°F for extended periods has little effect on properties.

Room-temperature chemically curing two-part epoxy-resin adhesives are usually cured with amines, and so lose their strength

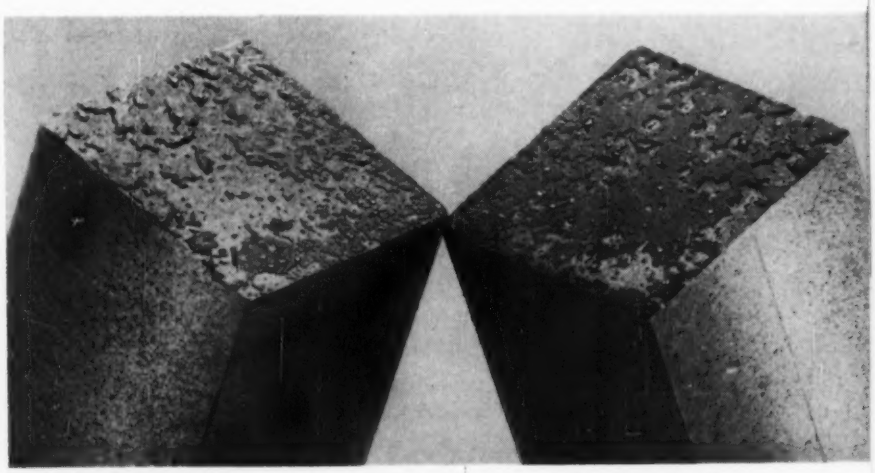
rapidly at about 150°F. A post-cure as outlined above raises the maximum temperature performance level to about 180°F.

One-part heat-cured epoxy resin adhesives are usually activated above 300°F. Because these adhesives are liquids, they require only contact or fairly low pressures during the cure cycle. Since there are no reaction byproducts during cure, no venting is needed.

Main uses for epoxies include bonding aluminum skins to metal honeycombs, railway rail joints and tie plates, cyclized rubber to metal, dissimilar materials such as aluminum and stainless steel, and wood-to-metal and metal-to-glass seals.



LIGHTWEIGHT SANDWICH: Magnesium sheet is bonded to expanded polystyrene core with one-part epoxy. Rubber & Asbestos Corp. photo.



STRONGER THAN METAL: Two 1-in. aluminum blocks pulled apart in test show how adhesive tore metal from each surface. Narmco photo.

Vinyl-Phenolics

To make phenolic adhesives more flexible for structural bonding, they're modified with elastomers or with thermoplastic resins. Vinyl resins plasticize the phenolic, toughen it and raise its impact strength. Such combinations are, in essence, thermoplastic-thermosetting adhesives. But their physical properties are much closer to the thermosetting side than to the thermoplastic part.

Vinyl-modified phenolic resin adhesives have good shear and peel strengths and good heat resistance. Shear strengths of bonded panels range from about 3000 to 5000 psi. Depending on the metal bonded, tensile strength will vary from 1000 to 4000 psi. Creep resistance is considered good, although the adhesive softens somewhat at higher temperatures.

Fatigue properties are typical of tough, thermosetting adhesives. Peel strength is superior to that of the epoxies. Vinyl-phenolics have good resistance to weathering, salt spray, humidity, oil, water and aromatic fuels.

Solutions and Films — Vinyl-modified phenolics are usually supplied as solutions which may be sprayed, brushed or roll-coated, and in film form. The latter are either free-film tape, coated paper tape, or reinforcing fabric coated on both sides. In some cases, the liquid phenolic resin must be mixed with the vinyl formal powder prior to use.

Before bonding, liquid vinyl-phenolics have to air-dry, then force-dry at 150° to 180°F for periods up to 30 minutes. This minimizes the amount of volatile material given off during the cure. Sometimes, this also improves strength.

Both Cure the Same—After the liquid type is force-dried, curing procedure becomes the same as for the film adhesives. Both must be cured under pressure of 50 to 150 psi and at temperatures of 240° to 325°F. Optimum film thickness varies from 2 to 6 mils, depending on the type of mating surface and required stress distribution qualities.

Vinyl-Butyral Phenolics

The most popular use for vinyl-butyral phenolic adhesives is in sandwich panel construction. They bond metals and high-pressure laminate facings to resin-treated paper honeycomb cores.

This adhesive type has high shear strength at room temperature. But strength drops off as the thermoplastic limit of the vinyl-butyral is approached. Compared with vinyl-modified phenolics, they have lower shear strength and aren't quite as tough.

Neoprene-Phenolics

High strength neoprene-phenolic

MAKES SCRAP USABLE: Tooling ring laminated from scrap tool metal with phenolic-elastomer easily withstands machining. Narmco photo.

adhesives of the phenolic-modified elastomer type have good adhesion to most metals and plastics. Usually, they offer good flexibility, vibration absorption and peel strength. They have excellent resistance to fuels, lubricants, humidity and salt spray.

Neoprene-phenolics are especially suited to joining thin metal sheets to themselves or to supporting structures. They may be used in honeycomb construction, if a special effort is made to physically form a fillet between the honeycomb and skin; neoprene-phenolic adhesives won't self-fillet.

Most neoprene-phenolics are solvent types. Special two-part chemically curing formulations are sometimes used to obtain specific tack, chemical resistance and strength. Mostly, they're moderately priced.

Watch Creep — This type of adhesive has a tendency to creep at higher temperatures when subjected to dead loads in excess of about two-thirds its shear strength. Room temperature shear strengths are in the range of 2500 to 5000 psi on aluminum.

Heat-curing neoprene-phenolic adhesives in dry film form are also available for structural bonding. Generally, they're compounded to give higher strength and heat resistance than liquid adhesives of the same type.

They usually perform better if the metal is first primed with a liquid adhesive and the film adhesive is placed between the faying surfaces after the primer has dried.

Resists Fatigue — Heat-curing films are usually semi-rigid. They have some elasticity and elongation, and as a result will stretch or give slightly under stress. This permits stress equalization and gives the adhesive excellent resistance to fatigue and peelback.

Heat-cured neoprene-phenolic dry-film adhesives range in shear and tensile strengths from about 1800 to 5000 psi.

In general, bonds produced with the dry-film adhesives are useable over a wide temperature range. Some compounds are effective down to –70°F, and have a top limit of around 180°F. Strengths at 180°F are about half of those at room temperature.

Good creep resistance and plastic flow enable the heat-cured film type to sustain rather high continuous loads for long periods.

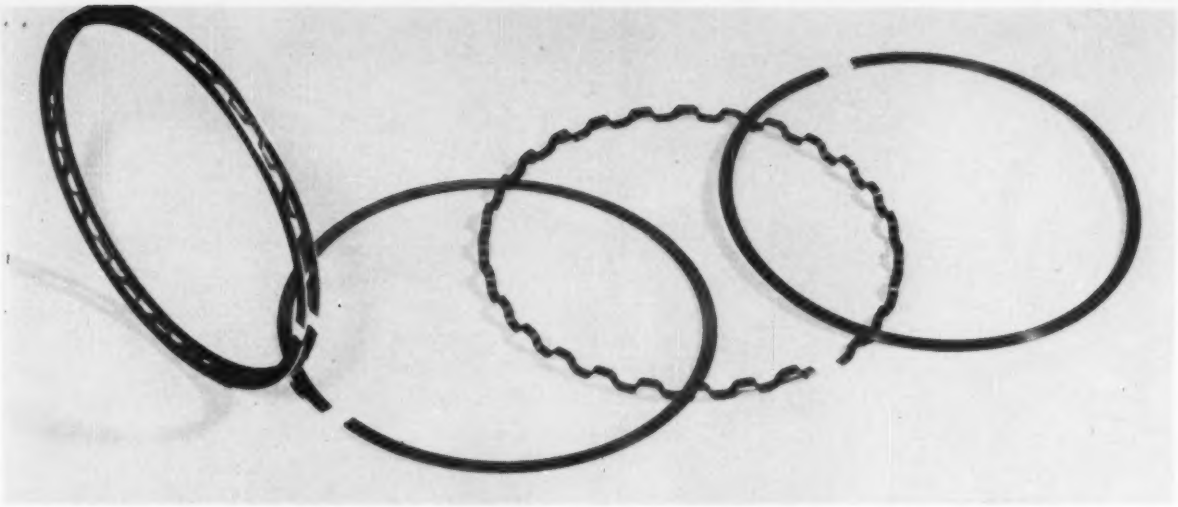
Nitrile-Phenolics

Adhesives of this type are the latest development in high strength elastomeric varieties. They're rapidly replacing the vinyl- and neoprene-phenolic adhesives. This new class has a broader range of properties, better flexibility, greater salt spray resistance, higher service temperature range and generally superior overall properties.

Tensiles range from 4000 to 8000 psi. Shear strengths are in the 2000 to 6000 psi range. Good impact strength and fatigue resistance, as well as resistance to plastic flow and creep are typical of this class. Some of them are suitable down to –80°F, although shear and impact strength are somewhat lowered. In some cases, however, shear strengths up to 4000 psi have been achieved at –65°F.

Generally, these adhesives can be used continuously at 300°F. Some films will take moderate stress for short periods at 500° to 600°F. Typical shear strength at 300°F is about 2400 psi. This drops to 800 psi at 400°F.

Combined With Fabrics—Nitrile-



HOLDS DURING ASSEMBLY: Phenolic-elastomer adhesive holds three parts of oil ring to prevent separation during handling. Adhesive is later dissolved by engine oil so parts operate freely. 3-M Co. photograph.

Phenolics come in liquid and dry film forms. Some of the dry films have fabric interliners. An adequate cure is obtained at 320°F for 20 to 30 minutes. For high strength at high temperatures, cure at 350°F or above.

Composite Films

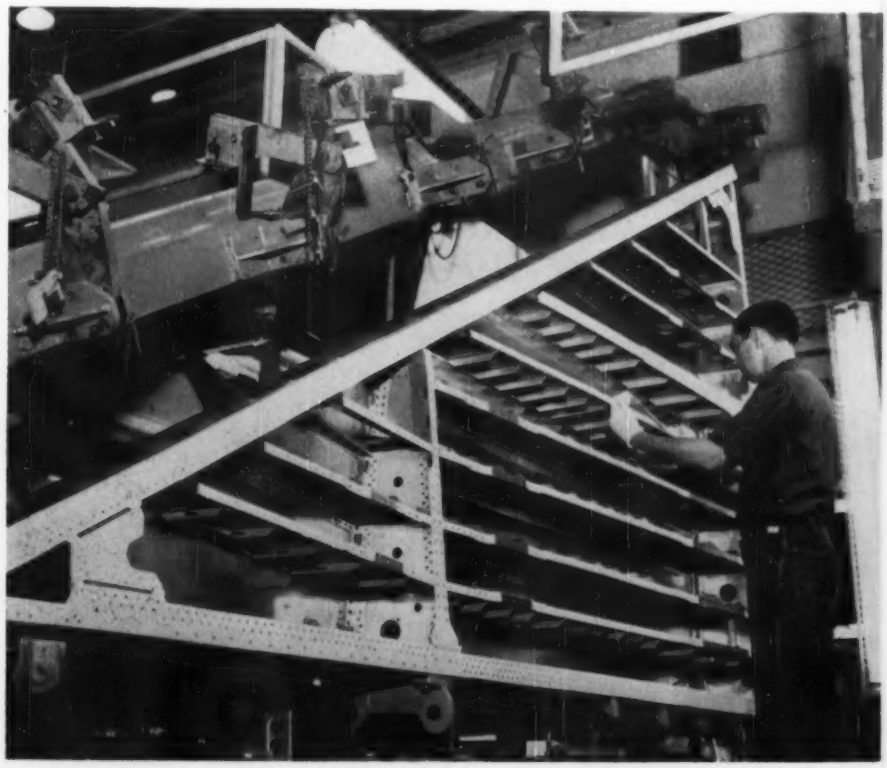
This is a fairly new series of heat-curing supported film materials for honeycomb sandwich construction. They consist of a high strength nitrile-phenolic film on one surface and a self-filleting epoxy film on the other. The elastomeric film bonds to the facing sheet while the self-filleting adhesive bonds to the honeycomb core.

This new concept provides the highest combination of peel strength and beam shear strength at service temperatures ranging from –70°F up to 250°F.

Composite adhesive films produce high strength aluminum honeycomb sandwich panels with beam shear flexure strengths of 1580, 1530 and 1385 psi at temperatures of –67°, 80° and 180°F, respectively.

Peel strengths of aluminum honeycomb panels bonded with this material are 18, 24 and 21 lb at the respective temperatures just cited. Because of their high performance level, less adhesive is needed to effect a good bond. This means lower finished weight.

Eliminates Priming — Supported composite film adhesives do away with priming of sandwich cores. The result is higher production of bonded sandwich components, lower fabrication costs, less weight, a saving in factory and storage space, reduced equipment cost and less manpower. Priming normally takes up to four hours.



BONDED STRUCTURE: Adhesive is used to bond skin to integral fuel tank for wing of Convair F-102 supersonic fighter. Narmco, Inc., photo.

MAINTENANCE, TOO: Water dispersed adhesive cements vinyl-faced insulation to ductwork. 3-M photo.

Thermoplastics: Lowest Cost For Milder Service

You wouldn't use titanium where cast iron will do.

By the same token, consider less costly adhesives if more modest properties might meet your needs.

▪ Thermoplastic adhesives are based mainly on certain elastomers and thermoplastic resins. In the metalworking context they include vinyls, natural and reclaimed rubber, and butadiene styrene rubber (GR-S). The resins or elastomers are either dissolved in solvent or emulsified in water, and may be modified with plasticizers.

Thermoplastic adhesives differ from thermosetting types in that they don't change chemically when heated, but soften at a definite temperature each time that temperature is reached. They have good flexibility, although tending to embrittle at low temperatures.

Since they're generally low in strength, thermoplastics are used mainly where cost is the most important factor. Still, they aren't limited to a narrow field; there are many uses for these low-cost materials.

Easy To Use—Adhesives of this type can be applied by brush, spray or roller-coating methods. They're usually passed near a heat source to flash off solvent, then bonded either by pressure from nip rollers or by simple stacking.

Many synthetic, natural and reclaimed rubber adhesives that set through solvent evaporation are classed as thermoplastics. Strictly speaking, hot-melt adhesives are immediately and directly sensitive to temperature. The rubber adhesives have a slower rate of change and never become completely liquid.

Natural Rubber

Adhesives based on natural rubber are mainly in the form of natural latex, stabilized to retard coagulation. In metalworking they're used mostly to bond sponge rubber to itself and to metals, felt to metal, and to bond natural rubber to metals, fabrics and phenolics.

Natural rubber adhesives can't carry constant loads for very long. They lose much of their strength at 120°F and crystallize at around —20°F. Above 160°F, the polymer permanently softens. On the other hand, they display excellent tack and water resistance. Surfaces coated with rubber-base adhesives can stand for weeks, then be bonded securely with a minimum amount of pressure.

Because natural rubber is an oil-soluble elastomer, adhesives of this type can't withstand petroleum derivatives. Natural rubber also breaks down on prolonged exposure to sunlight.

Reclaimed Rubber

Low cost, good physicals, wide tack range, easy surface preparation and high wet strength are typical of adhesives based on reclaimed rubber. As a result, they're the most widely used of the rubber-base types. The metalworking industry applies them in bonding felt and natural, GR-S and reclaimed rubber to steel, stainless, malleable iron, brass, aluminum, magnesium and titanium.

They're also used for bonding sponge rubber to metal. Strong bonds are maintained over a range of —30° to 180°F. Because this type is thermoplastic, strength drops as temperature goes up. They fail under fairly low constant loads, and so are used for minimum-strength work where cost is important. Reclaim won't withstand most common solvents and will deteriorate when exposed to sunlight.

Butadiene-Styrene

The butadiene-styrene co-polymers, or GR-S, are similar to natural rubber in elasticity, strength, and poor oil resistance. Their general properties closely resemble those of both natural and reclaimed rubber. GR-S differs in that it has superior aging traits and doesn't degrade as quickly on exposure to high temperatures.

This type is more susceptible to creep and plastic flow than are the neoprenes. Its useful temperature range is about —40° to 160°F. GR-S adhesives come in solvent and latex types. Use of either with metals is somewhat limited.

The Vinyls

Polyvinyl acetate adhesives adhere well to metals, glass, wood, and porous materials like leather and cloth.

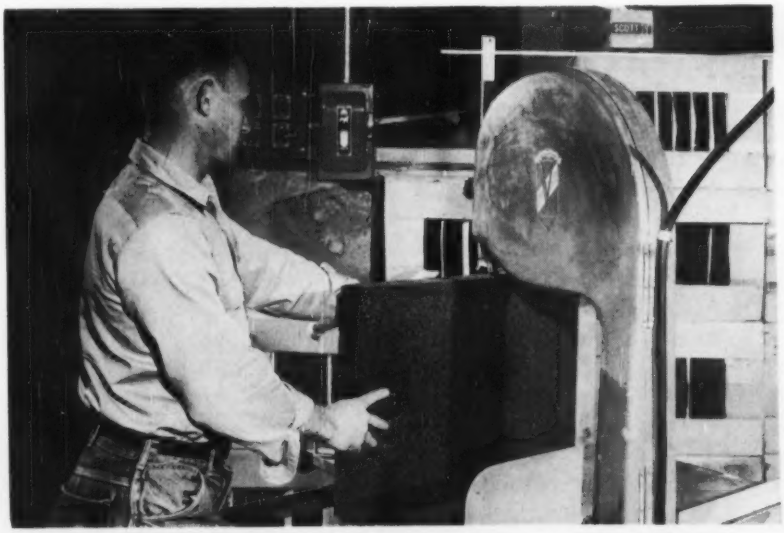
Vinyl acetate solvent adhesives have excellent resistance to grease, oils and gasoline, but their resistance to water and polar solvents is only moderate. Bond strengths of around 3000 psi are common.

Vinyl acetate emulsions are particularly useful with porous materials such as wood and paper. Wet tack, combined with quick setting properties, makes them quite suitable for automatic labeling operations, case sealing, and continuous lamination of metal foil and paper.

Other Features—These adhesives are odorless and tasteless and can be made fungus resistant. They can be compounded to withstand temperatures of 150°F under low stress.

Vinyl-vinylidene resin adhesives are solutions in powerful solvents like methyl ethyl ketone. The dried films are tough, strong, transparent, and colorless. They are resistant to hydrocarbon solvents, chlorinated solvents, greases and oils.

FORMS LIGHT SEAL: Contact bond rubber-base adhesive holds velvet strips to edge of opening in front of a camera case. 3-M Co. photo.



SANDWICH CORE: Today's adhesives make it possible to bond materials like this slab of foamed glass to porcelainized steel. 3-M photo.

HOLDS ON PAINT: Neoprene-base adhesive bonds rubber weatherstrip to painted truck door. 3-M photo.

Thermosetting-Thermoplastics Fill the Middle Range

This is probably the most versatile group.

They offer good all-around properties, form the main body of general-purpose adhesives used in metalworking.

▪ Thermosetting-thermoplastic adhesives are semi-rigid, with medium strength. Although high shear strengths are obtained, they produce lower-strength bonds than thermosetting adhesives. Neoprene and nitrile rubber adhesives are typical of this group.

They have fair to good peel strength, good flexibility, and some can be used for load-bearing applications. Thermosetting-thermoplastic adhesives offer a big advantage in their low-cost application. They can be sprayed, rolled, brushed or applied in film form. Little or no heat is needed to complete the bond.

The Neoprenes

Neoprene-base adhesives are considered the most versatile of the low-cost adhesives. Compared with other rubber-base types they have excellent strength (150 to 900 psi shear), good dead load properties, excellent peel strength (10 to 30 PIW), good tack, high water resistance, good resistance to oil, gasoline and heat, and are slow-aging.

They also provide high resistance to aliphatic solvents, acids, alkalis, heat and sunlight. Bonds they form between most synthetic rubbers and metals are quite strong.

The neoprenes are superior to other rubber-base types in their ability to sustain continuous stress loads without failure. Some can support more than 100 psi for extended periods.

Covers Wide Range—Neoprene adhesives aren't generally recommended for continuous service above 200°F; but some types will carry rather low loads for short periods at temperatures up to 350°F.

Neoprene adhesives are used to bond GR-S rubber and neoprene to steel, malleable iron, stainless

steel, brass, aluminum, magnesium and titanium. They offer excellent adhesion to aluminum, steel and other metals; supported vinyl plastic; high pressure laminated plastics, leather, and many types of rubber, polyesters and epoxies.

Physical and chemical properties can be varied considerably by additives and fillers. Most neoprene adhesives are solvent types; good latex varieties are also available. Special two-part chemically curing types provide specific tack, chemical resistance and strength.

For Contact Bond—Some neoprene-base adhesives are compounded to bond on contact. During contact bonding the adhesive is first dried until it seems to have no tack at all. But when parts coated with it are pressed together the bond immediately supports considerable stress.

Neoprenes aren't usually as shelf-stable as reclaimed rubber or GR-S formulations; but some neoprene adhesives are still useful after storage periods up to a year.

OFFERS HIGH STRENGTH: Honeycomb sandwich panel with one metal face pulled back demonstrates peel strength of neoprene types. 3-M photo.

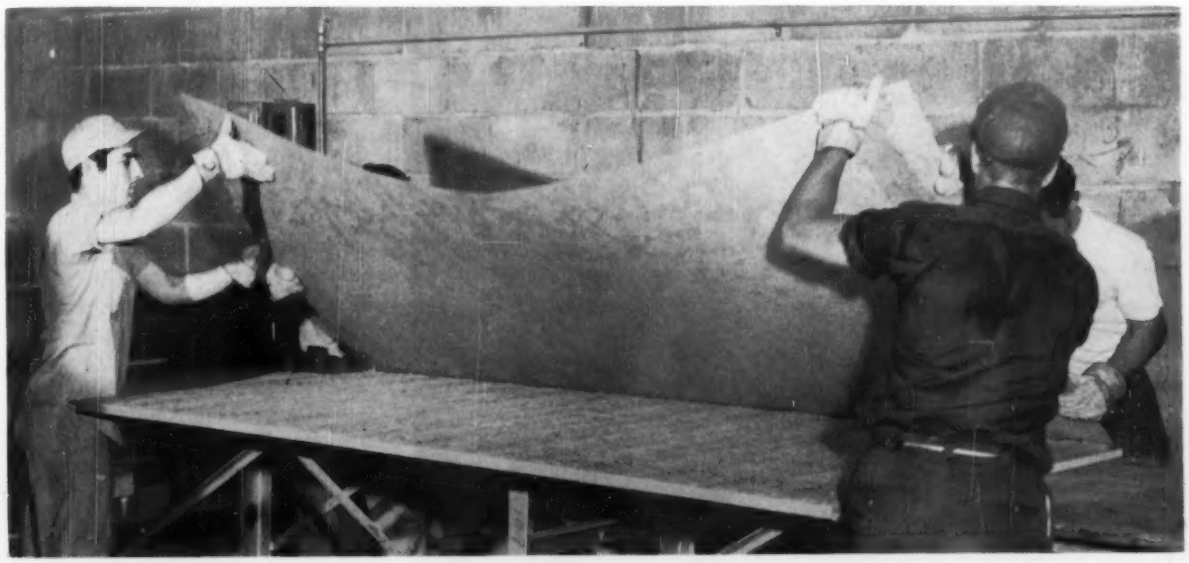
Nitrile Rubbers

Nitrile rubber (acrylonitrile-butadiene) adhesives offer high strength, excellent aging and good chemical resistance. The latter includes resistance to aliphatic solvents and to many plasticizers which cause bond failure in other adhesives. They're especially good for bonding rubber and vinyls to metal.

The nitriles are fair under dead loads, offer good tack, excellent water, oil and gasoline resistance, and resistance to heat and cold.

Nitrile adhesives maintain adhesion and flexibility in thin films over a temperature range of —65° to 250°F. Depending on the formulation, shear strengths will range from about 150 psi to as much as 2000 psi. Thermosetting-thermoplastic types carry good loads up to 160°F.

For Later Use—Nitrile adhesives usually dry completely tack-free. They're non-blocking and can be applied to parts which are then stored for later bonding. When bonding is to be done, the adhesive is reactivated with heat.



BONDS ON CONTACT: Sprayable neoprene-base contact bond adhesive instantly locks sandwich-panel parts together, makes for high assembly rate in curtain wall construction. Rubber & Asbestos Corp. photo.

Tailor Your Methods to the Job

As adhesives vary, so do the special techniques and tooling for working with them.

Here are the basic methods. Departures and variations will depend on each job and the formulations you use.

▪ Production with adhesives involves four basic steps: preparing the bonding surfaces, applying the adhesives, assembling the components, and bonding the assembly.

Each of these four operations must be tailored to meet the demands of the adhesive used. Improper handling of the adhesive is as often the cause of poor performance as is poor choice. There are exceptions; but by and large the materials are not as critical as surface preparation and design of mating parts.

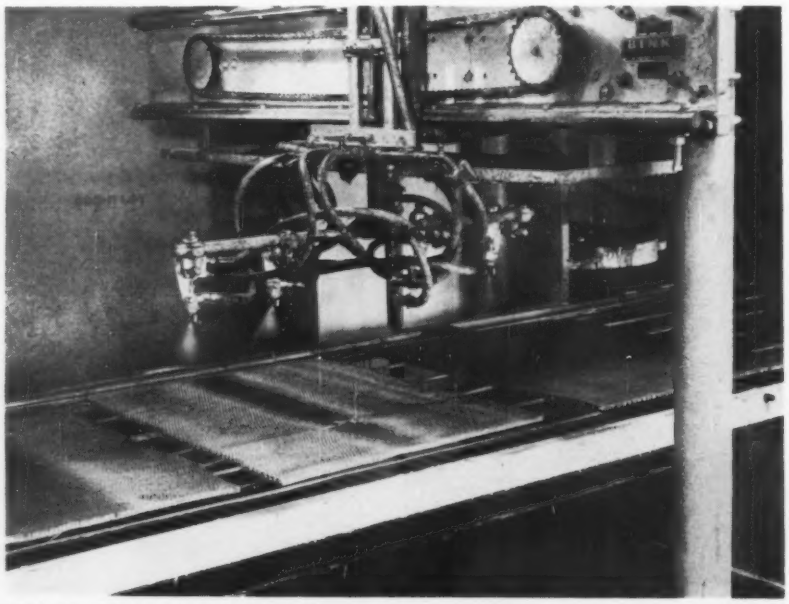
Cleanliness Is Vital—Materials to be bonded must be clean. Some materials have gained a reputation for being difficult to bond when improper cleaning actually caused most of the trouble.

Molded rubber is an example. Some mold release agents appear as a film on the surface of the molded part. Most often, the film is weak and must first be removed.

Similarly, oil on metal, dust on wood parts, paint over-spray and surface oxidation on metal, all offer poor bonding surfaces. They should be removed before the adhesive is applied.

About Painted Surfaces—Baked enamels are generally good bonding surfaces for most adhesives. Oil paints are satisfactory for low unit strength jobs. Adhesives which contain solvents that may attack the paint should be avoided.

Lacquers may be attacked by the solvents in some adhesives. Asphalt and calcimine painted surfaces are almost always no good. In general, the bond can't be any better than the paint bond. If the paint bond is doubtful, remove it or at least abrade it to expose the substrate.



MASS PRODUCTION: Solvent-dispersed adhesives are automatically sprayed on honeycomb cores by fixed nozzles. Rubber & Asbestos photo.

Applying Adhesives — Straight-line adhesive application with parts handled by mechanical conveyor obviously is the most desirable setup. The adhesive is applied at the first stage, the adhesive film prepared for bonding in the second stage, and the application of pressure, if necessary, in the third stage.

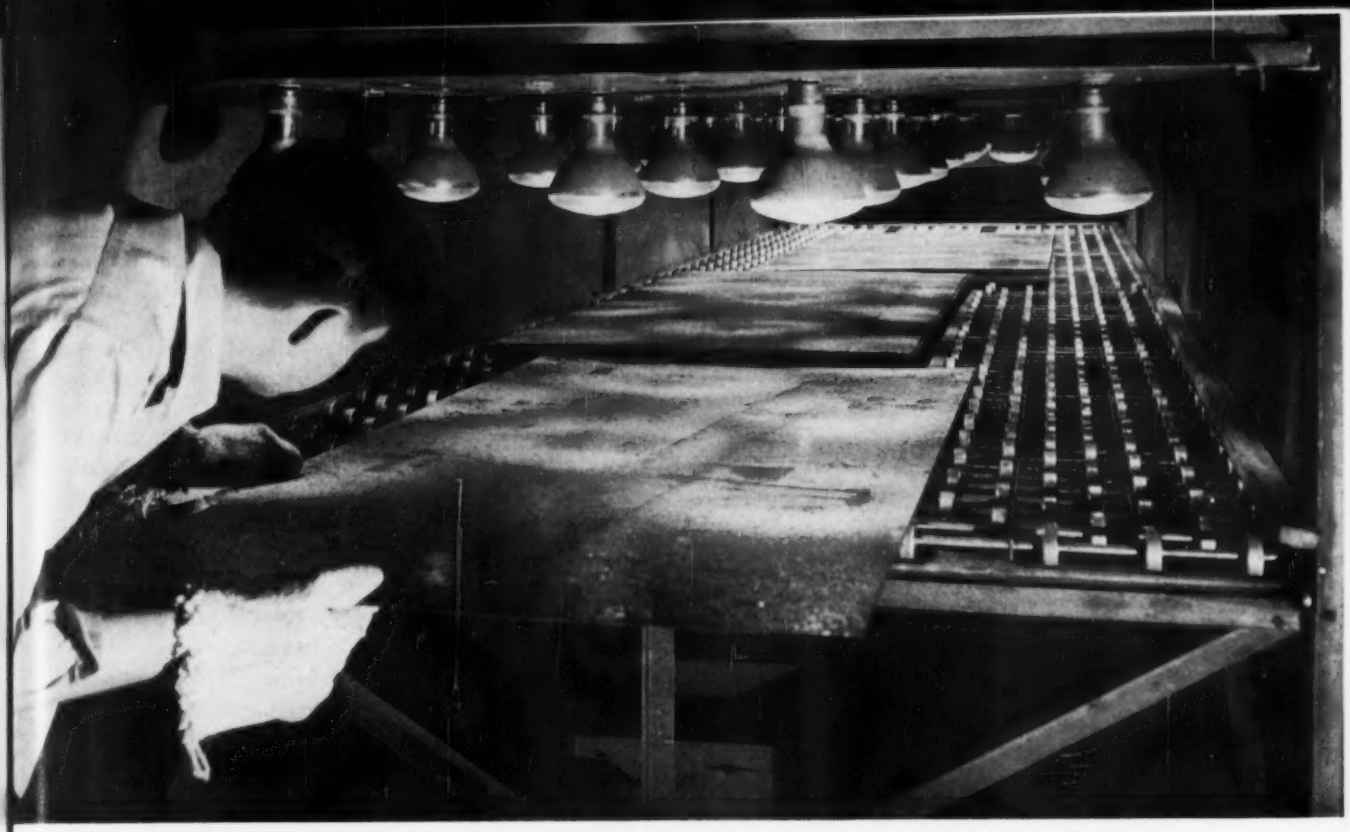
Spray Coating—This method offers the same advantages for adhesives as for paints. Adhesives ranging from water-thin resins to viscous synthetic rubber products and even abrasive-filled materials are applied in this manner.

Some adhesives and coatings may be applied as an even, perfectly smooth film. They should be sprayed with a pressure type external mixing gun. Fast-drying adhesives, particularly those based on synthetic rubber, cannot be applied with paint smoothness, but will spray uniformly in almost any thickness desired.

Rubber adhesives tend to cobweb. This can be minimized by holding the gun close to the work and by using only the amount of air pressure needed to atomize the adhesive (usually from 40 to 60 lb line pressure). For continuous lines, automatically traversing spray systems are also available.

Extrusion Gun Coating—Adhesives may be applied most efficiently in certain types of applications by means of an extrusion gun. Guns may be actuated either by hand pressure or air pressure.

This method is suited to jobs where a bead or ribbon of adhesive



SPEEDS DRYING: Adhesive-coated facing and core materials are dried under infra-red lamps. 3-M photo.

must be accurately placed. Extrusion guns may be fixed in position and triggered automatically as the work moves, either in a line or on a turntable.

Roller Coating—Where continuous production runs on sheets of one thickness are involved, roller coating is fast and economical. If large, flexible sheets are handled or fed directly to a conveyor, a topside coater is almost always worth its higher first cost. As the name implies, this type of machine coats sheets with the adhesive side up.

Synthetic rubber adhesives tend to stick to the applicator roll and won't apply evenly from a smooth-surfaced roll. To remedy this, the roll should contain reservoirs for the adhesive and enough surface irregularity to prevent suction.

To keep the adhesive from losing solvent by evaporation, which increases viscosity, feed it to the pan continuously at the used rate. Production should be as nearly continuous as possible. Shutdowns, if extended, may mean cleaning the coater before resuming production.

Brush Coating—Use brush coating for small or irregular parts, or where volume doesn't warrant investing in more elaborate equipment. Use only brushes of the highest quality, with either nylon or all animal bristle.

To apply rubber base adhesives by brush, put a generous quantity of adhesive on the brush and flow the adhesive on in a single sweep, much as you would apply varnish. Don't try to brush it out or "scrub" it.

Assembly Methods — Basically, assembly with adhesives involves placing cleaned and coated parts together, with the surfaces to be bonded held in intimate contact until the adhesive sets. There are various ways of doing this, depending on the materials, their shapes, and properties of the adhesive.

Wet Assembly—This technique involves bringing the bonding surfaces together while the adhesive is liquid and holding them with pressure until the adhesive sets or develops its bonding strength.

With nonporous materials, such as metal and plastics, loss of volatile material is practically impossible except at edges. Thus, the adhesives used must be the kind that set through chemical action, through cooling, or through polymerization or condensation at high temperatures.

Wet assembly uses relatively low pressure. It's easy to obtain accurate alignment if mistakes in position are noticed before the adhesive sets. Pressure jigs may be necessary during setting.

Contact Bonding — This method requires pressure only to accomplish bonding.

Contact adhesives, with inherently higher strength than softer, truly pressure-sensitive types, generally work best when both surfaces are coated. If adhesive is applied to only one surface, more solvent must be present in the film

MANY FORMS: Adhesives come as powders, pastes, liquids and films, go on by spray, brush, spatula or Plews oiler. Rubber & Asbestos photo.

at the time of assembly to permit transfer.

Buna-N, neoprene, and reclaim-rubber adhesives generally have enough residual tack after solvent evaporation, but tack varies with each type.

Generally, contact adhesives develop reasonable bond strength as soon as assembly is completed. Pressure requirements are usually low—often a hand roller will do the job, and pressure need be applied only long enough to insure full contact.

Drying—Whether one or both surfaces are coated, forced drying of the adhesive film by heating and circulating air is usually desirable and often necessary. Heat speeds drying, makes it independent of weather conditions, and prevents water condensation on the adhesive film.

Controlled drying also makes it easier to begin assembly when the adhesive film has the right amount of tack, this being the point at which the best overall bond can be made. Under some conditions, it may be more practical to dry the adhesive film completely and later reactivate it with heat or a solvent.

Heat Activation—For adhesives that are more tacky with heat than at room temperature, heat activation is an especially useful assembly method. Parts to be bonded are cleaned, coated and then dried until almost totally free of volatiles. Then they're heated until the adhesive becomes tacky enough to adhere to a similar adhesive coat. The parts are assembled and pressure is applied.

Assemblies are usually at maximum strength as soon as the adhesive has cooled, though some adhesives gain further strength through subsequent chemical change.

Heat activation has an important advantage, especially for assembly line production, in that the parts can be handled and even machined as soon as they're assembled. It's probably the best method where remaining solvent might cause blistering or reduced strength, and with non-porous materials that prevent solvent escape after assembly.

Bonding and Curing—Effective adhesive bonding always requires some pressure. It may be applied in any one of several ways, depending on the nature of the adhesive, design of the part, and its size. Hydraulic presses, hydraulic pads, hydraulic cylinders, air cylinders, spring-loaded jigs, air-filled rubber bags and vacuum bags have all been used.

Whatever the method, it must meet three basic requirements: the amount of pressure should be adequate; pressure should be retained at a constant level; and it should be distributed uniformly over the work.

The amount of pressure required varies with the kind of adhesive and assembly. Some thermosetting adhesives, for example, require pressure as high as 200 psi for 15 minutes to several hours. On the other hand, certain thermosetting epoxy-resin adhesives will form a tight bond at room temperatures with only enough pressure to maintain contact.

Contact adhesives require high pressures, but only for brief periods. If in doubt about the amount of pressure, check the adhesive manufacturer's recommendations.

Keep pressure evenly distributed. High and low pressure spots within an assembly can result in lack of uniform contact and differing film thickness — which may result in varying bond strength.

Heat—Many thermosetting adhesives must be cured under heat as well as pressure. Oven heating is quite common, even though it involves long curing cycles. Forced circulation is required to insure uniform temperature. Ovens may be heated with gas, oil, electricity, or infrared units.

Forced circulation isn't necessary with infrared units since the assemblies heat by radiation.

Acknowledgements—The editors are grateful to many companies and individuals for helping make this feature possible. Special thanks go to Armstrong Cork Co., the Borden Co., Ciba, Inc., the Goodyear Tire & Rubber Co., Minnesota Mining & Mfg., Co. (3-M), Narmco, Inc., Raybestos-Manhattan, Inc., Rubber & Asbestos Corp., and Shell Chemical Corp.

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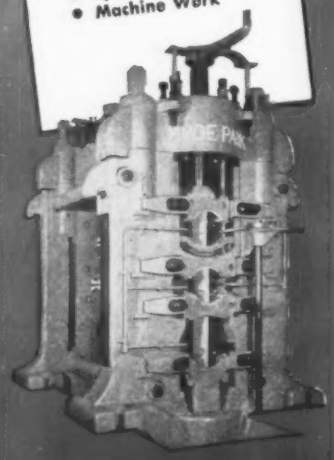

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 97.

Bearings

Needle thrust bearings described in a catalog come in bore sizes from ⅜ to 3 in. (The Torrington Co.)

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Flexible Couplings

Now being distributed is a catalog on flexible couplings. It gives: dimensions, list prices, horsepower ratings. (Acme Chain Corp.)

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Temperature Detector

How to obtain reliable, low-cost temperature detection is described in a 30-page catalog. (Thomas A. Edison Industries)

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Silicone Insulator

A brochure describes how a silicone compound curtails arcs, shorts, and the formation of leakage paths on insulators exposed to contaminated atmospheres. (Dow Corning Corp.)

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Ingot Handling

A report tells how Federated Metals Div., American Smelting and Refining Co. cuts handling costs. Nonferrous ingots used to be stacked loose on skids. They were loaded into box cars by hand. Unitizing ingots with steel strapping has cut loading time 50 pct. Customers report unloading costs are down 75 pct. (Acme Steel Co.)

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Strain Gages

Bonded-filament resistance strain gages are listed in a catalog. A wide variety of etched foil gages for high, intermediate and room

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temperature applications are covered. So are standard, semi-standard and special purpose wire gages. (Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp.)

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Shock Control

A 12-page bulletin describes full bonded tube form mountings and joints. These are specially engineered for vibration and shock control. (Lord Mfg. Co.)

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Fiber Research

Two literature lists deal with fiber research. One covers electron microscope work; the other, X-ray diffraction investigations. (Philips Electronics, Inc.)

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Vapor Coating

Three bulletins discuss properties of molybdenum hexacarbonyl, tungsten hexacarbonyl and tungsten hexachloride. One use of these chemicals is in vapor deposition of molybdenum and tungsten metal coatings on other materials. (Climax Molybdenum Co.)

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Vibrating Feeders

A 96-page book deals with electric vibrating feeders and conveyors. Controls, installation methods, principles of operation and individual unit specifications are included. (The Jeffrey Mfg. Co.)

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Materials Handling

Improved materials handling results when certain types of pneumatic equipment are arranged in selected combinations. So points out a 12-page booklet. (Fuller Co.)

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Conveyors

How one firm cut shipping department handling costs is described in a 4-page bulletin. It tells how products move from stacking areas

Austin-Western model 210 hydraulic crane speeds loading of processed railroad ties onto flat car.

A-W hydraulic crane saves time and money—proves versatile materials handling tool

Austin-Western's hydraulic crane is " . . . more efficient, faster and easier to handle than a smaller capacity fork lift or much larger locomotive crane!" So says Wm. L. Groff, manager of the Huron Wood Preserving Division of the Detroit and Mackinac Railway, Tawas City, Mich.

Proves efficient

He adds, "We began using the crane two years ago to speed handling of ties, poles and timber in our pressure treating process. It proved so versatile and efficient that we use it for all kinds of materials handling."

Mr. Groff states that it used to require 2 to 2½ hours for three men and a forklift to unload processed ties from trams used in treating. Final loading onto flat cars called for an hour's time of a large locomotive crane and 4-man crew. The A-W crane now does both operations in less than 2 hours.

Costs are below estimates

"Our A-W crane with 4-wheel drive and 4-wheel steering is highly maneuverable," he says. "It goes almost anywhere . . . over track, under doorways or piping.

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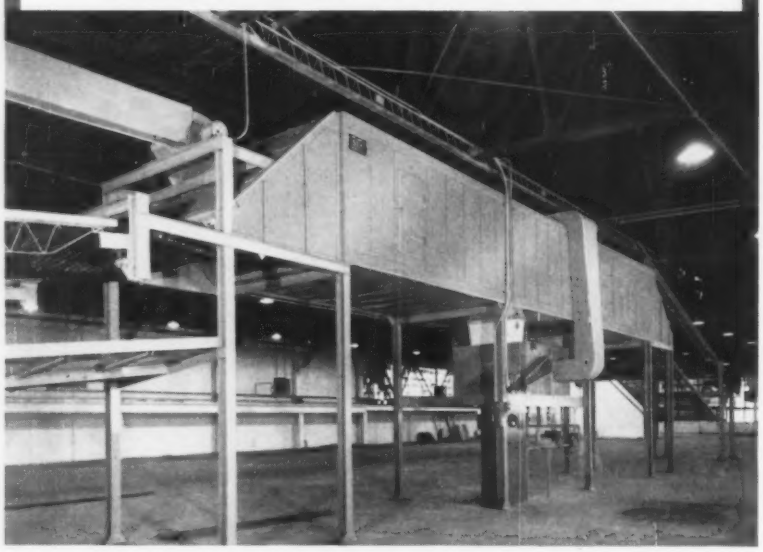

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FREE LITERATURE

in the shipping department directly to loading docks over a conveyor line. (A. B. Farquhar Div., The Oliver Corp.)
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Temperature Controller

An electronic temperature controller shown in a bulletin serves electric heat treating furnaces, etc. It responds to dc inputs of less than one one-millionth of a volt. (Hagan Chemicals & Controls, Inc.)
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Hose Couplings

An 8-page bulletin covers couplings and fittings for practically every type industrial rubber hose. (Hose Accessories Co.)
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Cold Saws

Cold saw machines shown in a bulletin cut ferrous or non-ferrous metals. Machine sizes, given in saw-blade diameters, range from 32 to 120 in. (Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc.)
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OBI Presses

OBI presses covered in a bulletin come in capacities from 35 to 75 tons. (Minster Machine Co.)
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Castings

A 32-page booklet discusses Meehanite castings. (For free copy write on company letterhead to Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.)

Couplings

Couplings shown in a 20-page catalog serve hydraulic and pneumatic applications. The couplings are leak-proof. They couple and uncouple in one second without special tools. (Titeflex, Inc.)
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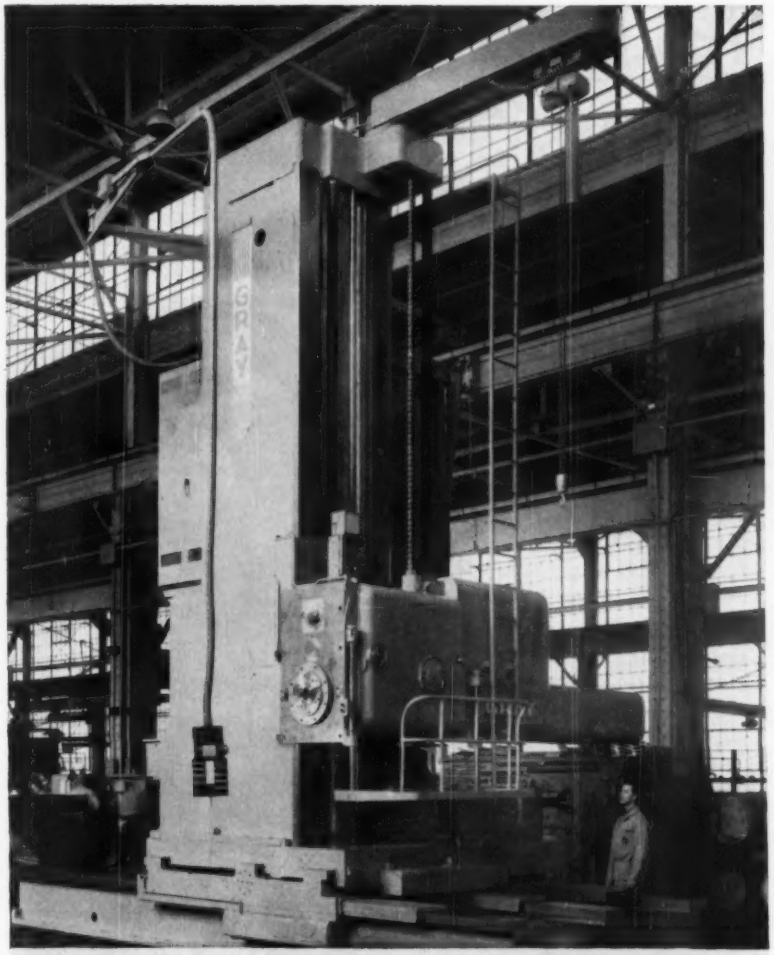
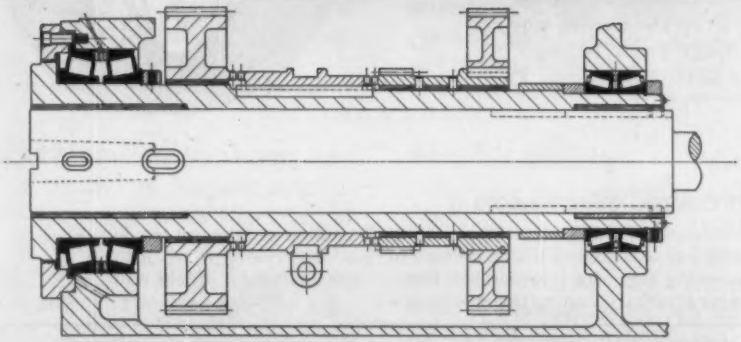
"We switched to TIMKEN® bearings to get greater accuracy and capacity," reports The G. A. Gray Company





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So, next time you need stainless or high alloy tubing, be sure you specify TRENTWELD. It's also available in titanium, zirconium, Zircalloy and Hastelloy†, in sizes from ⅛ to 40 in. Meanwhile, why not get full details. Send today for the free, 50-page Trent Tubing Manual. Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

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Casters and wheels are offered in a 16-page catalog. Swivel or rigid casters come with rubber, plastic, steel or pneumatic wheels. Also listed: more than 500 different wheels. (Hamilton Caster & Mfg. Co.)

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Voltage Control

High-voltage controls are outlined in a 16-page booklet. Both full and reduced voltage types can serve squirrel cage, synchronous and wound rotor motors. (Cutler-Hammer Inc.)

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Heat to Volts

A chart lists temperature-millivolt conversion tables. For thermocouple users, it converts either Fahrenheit or Centigrade in 5° increments. (Thermo Electric Co., Inc.)

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Strainers

A 17-page catalog describes automatic and twin basket self-cleaning strainers. The strainers are for removal and continuous disposal of fine suspended particles from all types of raw or process water and other liquids. Installation can be made on the pressure or suction side of the pump. Pipeline sizes range from 2 to 48 in. (S. P. Kinney Engineers, Inc.)

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Mill Motor Couplings

Mill motor couplings covered in a brochure are all-steel, self-aligning. They fit all tapered shaft ends in shaft sizes ¾ to 6⅝ in. (Metal Products Div., Koppers Co., Inc.)

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Variable-speed pulleys and combination pulleys are featured in a 24-page catalog. (Lewellen Mfg. Co.)

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Surface - active liquid introduced in a data sheet overcomes organic contamination in copper cyanide plating baths which aren't air-agitated. It restores full brightness to dull, blotchy deposits. (MacDermid Inc.)

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Aluminum mill products are listed in a 24-page booklet. These include: sheet, plate, foil, bar, wire, extrusions, tubing, forgings, billet, pig and more. (Kaiser Aluminum & Chemical Sales, Inc.)

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Machinability

Stainless steel machining data is contained in an 8-page bulletin. Feeds, machining speeds and grades of carbide cutting edges are covered. It discusses those best suited for roughing, semi-finishing and fine finishing 188 compositions of stainless steel. Types range from 201 to 502. (Kennametal Inc.)

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91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110

If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

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Page ..... Product .....

PLEASE TYPE OR PRINT

Name .....

Title .....

Company .....

Co. Address .....

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City ..... Zone ..... State .....

FREE LITERATURE

in a folder. Solutions involve use of a new one-step direct-positive paper. (Peerless Photo Products, Inc.)

For free copy circle No. 28 on postcard

Brazing Sheet

Flexible 0.005-in. thick brazing sheet for high-temperature honeycomb is introduced in a data sheet. (Wall Colmonoy Corp.)

For free copy circle No. 29 on postcard

Heat Exchange

Aluminum uses in heat-exchanger fabrication are described in a 16-page publication. (Reynolds Metals Co.)

For free copy circle No. 30 on postcard

Turnings Crusher

Metal turnings crushers are covered in a brochure. Six models range in capacity from 2½ to 50-tph. (American Pulverizer Co.)

For free copy circle No. 31 on postcard

Overhead Conveyor

Introducing a power and free overhead conveyor is a new bulletin. Key conveyor asset is its route selector dispatch head. A route selector dial can be set to automatically guide a carrier to any one of 80 stations in the system. (Columbus McKinnon Chain Corp.)

For free copy circle No. 32 on postcard

Drilling Hammer

Dustless in operation, a new concrete and rock drilling hammer and companion dust extractor are covered in a folder. The "inhaling" air hammer drills 13/16 to 1⅜-in. holes. (Thor Power Tool Co.)

For free copy circle No. 33 on postcard

Speed Reducers

New double reduction, hollow shaft, worm gear speed reducers are shown in a catalog. They come in both torque arm and flange mounted types. Each comes in three sizes, covering an output range from 0.041 to 2.552 hp, a ratio range from 66 2/3 to 4466:1, maximum output torque range of 1380 to 7678 in. lb. (Winsmith, Inc.)

For free copy circle No. 34 on postcard

Slim Valves

A bulletin describes new slim control valves. Valves are only 1 in. thick by 3 in. wide; mount conveniently on any machine, and are easily manifolded into compact control centers. (Hunt Valve Co.)

For free copy circle No. 35 on postcard

Three-way Lathe

An 8-page catalog describes a versatile lathe. It shows many uses as a toolmaker's lathe, a second operation lathe and as a turret lathe. (Carl Hirschmann Co., Inc.)

For free copy circle No. 36 on postcard

Electric Tools

In 12 pages, a catalog describes a line of solenoid-operated impact hammers, punches, stakers and indexing tables. The tools rivet, crimp, swage, punch and mark. (Black & Webster, Inc.)

For free copy circle No. 37 on postcard

Electric Motors

Motors and motor applications are discussed in a 16-page guide. It's designed to make motor selection easy. (Century Electric Co.)

For free copy circle No. 38 on postcard

Zinc Diecasting

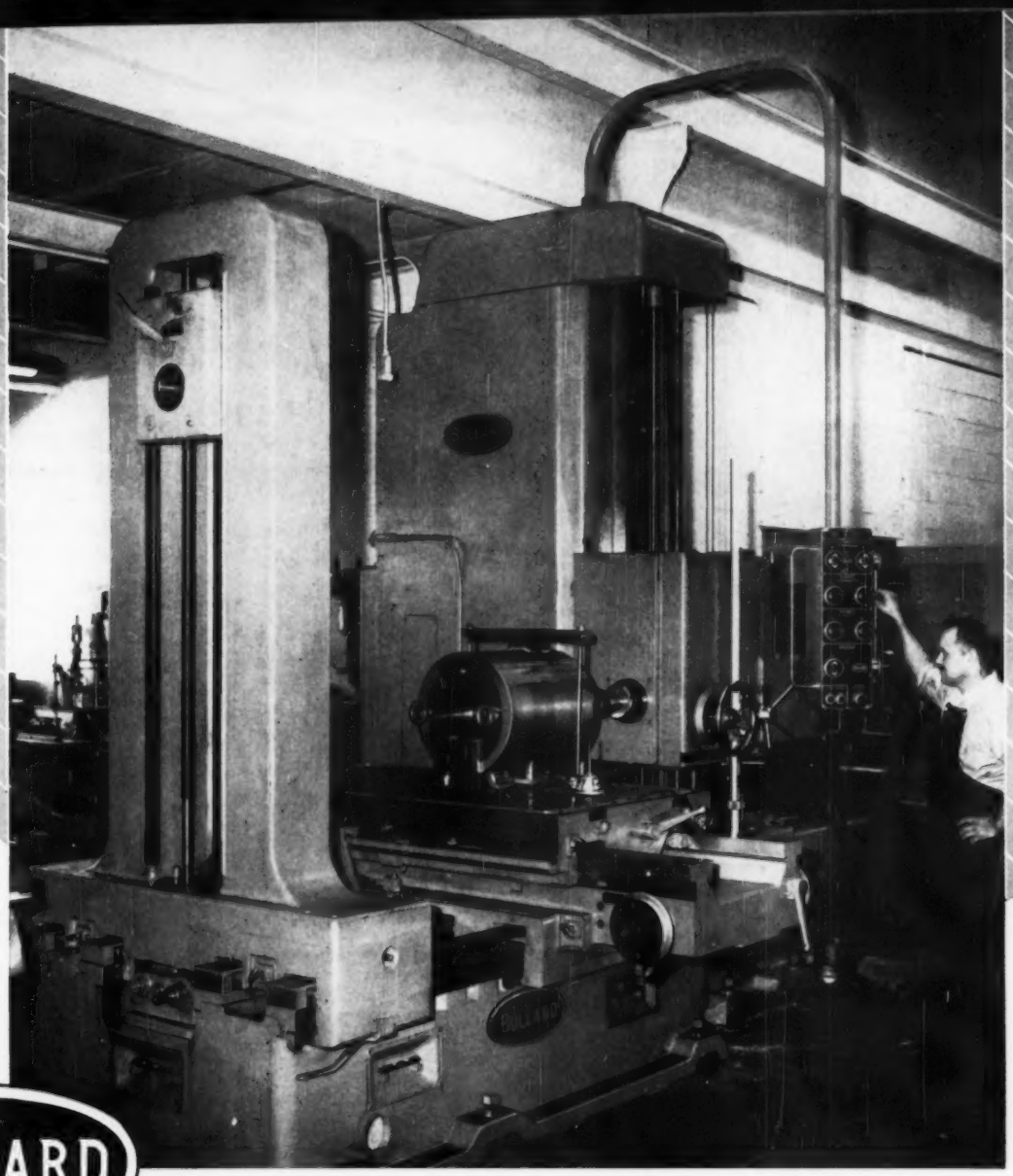
End uses of zinc diecastings are featured in a revised catalog. It contains 192 new photographs, two new sections and many new applications of zinc diecastings. (New Jersey Zinc Co.)

For free copy circle No. 39 on postcard

Alloys, Corrosion

Corrosion-resistance data on a company's alloys is packed into a 40-page booklet. It shows penetration rates in some 250 corrosives. (Haynes Stellite Co.)

For free copy circle No. 40 on postcard



BULLARD

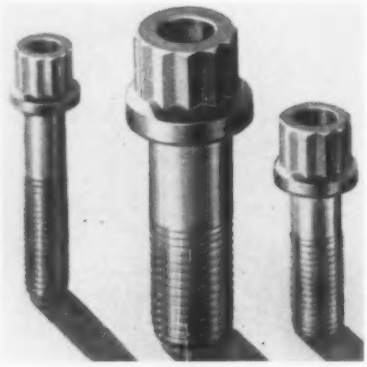
"It's Really **RUGGED** and Versatile"

"In our business," says Mr. Stanley McDonald,
Plant Foreman of E & M Enterprises, Inc. of Middleport, New York,
"building special machinery for a wide segment of industry, we needed
a horizontal boring machine that was rugged, accurate, faster,
easy to set up and control. We decided that the Bullard H.B.M., Model 75
best met our requirements. Now, after more than two years of operation,
we're convinced we made the *right* choice and bought the *right* machine."

A call to the nearest Bullard Sales Office or Distributor will convince you that the Bullard H.B.M., Model 75 is the right choice for you.

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

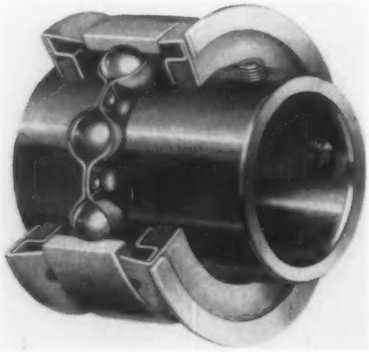
New Materials and Components



Standard Bolts Serve at 1600°F Temperature

Standard structural fasteners now are available for use to 1600°F. Offered in airframe or engine bolt types, the fasteners' major uses are in jet engines, rocket motors and aircraft and missile structures. However, they may find extensive applications in gas and steam turbines and other jobs. Bolts rate at a minimum tensile strength of 155,000-psi at room temperature, 135,000-psi at 1200°F, 85,000-psi at 1600°F. Rated minimum stress rupture life is 100 hours at 1500°F and 10 hours at 1600°F. In both cases, sustained load is 30,000 psi. Bolts are fabricated of either: M-252 alloy, Waspalloy, Udimet 500 or Hastalloy R-235. Both engine and airframe bolts are external wrenching with a 12-point head. (Standard Pressed Steel Co.)

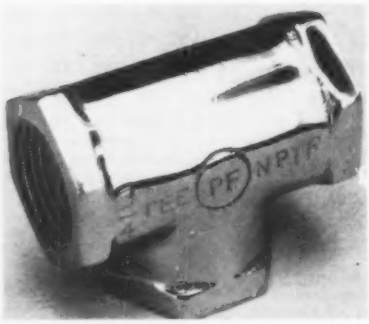
For more data circle No. 41 on postcard, p. 97



Simplicity of Bearings Keeps Costs Down

Of simple construction to meet low-cost requirements of many applications, new machine bearings units handle light loads at normal speeds. Each unit includes a single row bearing of deep groove design. This has an extended inner ring with two set screws for locking the bearing on its shaft. Separable seals can be used either singly or on both sides of the bearing. A wire lock ring holds the entire unit securely in its straight bore housing. Bearing units are available in ½ through 1 3/16-in. shaft sizes. Like the manufacturer's other bearing products, these machine units have extra smooth honed raceways and high-quality balls. (Hoover Ball & Bearing Co.)

For more data circle No. 42 on postcard, p. 97



Pipe Fittings Don't Leak Under High Pressure

Even under high pressures new threaded NPTF pipe fittings don't leak. The fittings, in a wide variety of sizes and shapes, hold pressures to 10,000-psi in pressure vessels, over 5000-psi in hydraulic systems —without leaks. They're made of malleable ductile normalized air-furnace iron for high impact resistance. Fittings come in pipe sizes ⅛ in.-27 through 2 in.-11½ with a hot dip galvanized finish plated with Brass Dichromate or a special dull zinc rustproof finish. Shapes include: tees, 45° and 90° elbows, reducing couplings and tees, pipe caps, hex bushings, unions and nipples. (Pipe Fittings Inc.)

For more data circle No. 43 on postcard, p. 97

Ionization Gage Measures Very High Vacuums

Keeping tabs on ultra-high vacuums, this modified ionization gage accurately measures vacuum down to 10^{-10} mm of mercury. Direct readings to 10^{-12} are possible. Three main advantages of the gage are: (1) Linearity of output is excellent over a wide operating range. Grid-like end covers prevent ions from straying away from the col-

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER III—Lustrous, Corrosion-Resistant Finishing with Chemical Polishing Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are widely accepted throughout industry as an economical means of providing corrosion protection, a good base for paint and decorative finishes for non-ferrous metals. Certain of these coatings also possess chemical polishing abilities that have luster-producing, as well as corrosion-inhibiting, effects on zinc and cadmium plate, zinc die castings and copper alloys. However, continued developments in this field have been so rapid that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this discussion of the many ways in which this chemical polishing characteristic can be used in final finishing or pre-plating treatments to produce a lustrous appearance with distinct display and sales appeal and appreciable savings in cost. Report I on decorative, corrosion-resistant finishes and Report II on paint base corrosion-resistant finishes are available on request.

The degree of luster possible on a surface is a function of the degree to which the surface can be smoothed. Leveling to provide a smooth surface can be achieved by mechanical or chemical means, or a combination of these, depending upon the luster desired and the original condition of the metal. Chemical polishing effectively imparts luster otherwise difficult and costly to obtain. For this reason, it is often used to supplement or entirely replace mechanical polishing, depending upon the application and the original condition of the metal. Chemical polishing has the additional advantage of providing overall treatment of the submerged part. It reaches into even the deepest corners and recesses that are otherwise inaccessible. Certain of the Iridites are specifically designed to perform this chemical polishing operation. Also, they provide corrosion protection as do all Iridites, thus may be used as a final finish or a pre-plating polish.

If Iridite is to be used as a final finish, in contrast to pre-plating treatment, the chromate conversion coating generated is allowed to remain, providing good corrosion resistance. Color inherent in these Iridite films ranges from a yellow cast to yellow iridescent. These coatings may be used without further treatment where this color is acceptable and good corrosion resistance is desired. Further, these basic coatings can be tinted by dyeing. Among the dye tints available are shades of red, yellow, blue and green. If desirable, the basic coatings can also be modified by a bleach dip leaving a clear bright or blue iridescent finish. In all cases bleaching reduces corrosion resistance.

As examples of this type of final finishing, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, lustrous chemical polishing of the as-cast surface of zinc die castings. Thus, in many cases, sizeable savings in finishing cost are realized by elimination of plating costs. This economical method can be used on tools, appliance parts, toy pistols, locks and many other small castings. Another example is the treatment of copper and brass parts, such as welding tips, to eliminate buffing and provide additional corrosion resistance. In many cases, handling costs are reduced appreciably by replacing piece-part handling with bulk processing. Still another example of the use of this chemical polishing and protective quality of Iridite is a simple system of zinc plate, Iridite and clear lacquer instead of more costly electroplated finishes. Typical of this type of lustrous finish are builders hardware and wire goods.

As a pre-plating treatment, in contrast to final finishes, Iridite can be used to chemically polish zinc die castings or copper prior to plating. In such cases, Iridite should be applied as an in-process step, so that the protective film is removed before the plating cycle. The savings in handling, material and labor costs are obvious. This process has made it practical to plate chrome directly over copper on steel, conserving nickel, yet producing a lustrous chrome finish. Used after stripping faulty plate in reprocessing zinc die castings, Iridite restores luster to the casting, thus making possible replating without blistering.

Other Iridite finishes are available to produce maximum corrosion resistance, a wide variety of decorative finishes and excellent bases for paint on all commercial forms of the more commonly used non-ferrous metals. As a final finish, appearance ranges from clear bright to olive drab and brown and many films can be bleached or dyed. As a paint base Iridite provides excellent initial and retentive paint adhesion and a self-healing property which protects bare metal if exposed by scratching. Iridites have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of their top performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product demands the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

Right Down Your Spring-Steel Alley

The spring steel you need may be sitting in our mill—ready to ship from stock or to roll, slit, heat-treat and finish to your specifications—but fast. Strip steels in widths up to $6^1/_2''$ tempered and $13''$ annealed or hard-rolled. You specify temper, finish, color, edge, forming properties, tolerance, etc. Find out about these "steels of a lifetime." Write for our 4-page folder highlighting products made from Wallace Barnes Spring Steel. Try us on your next requirement.

Wallace Barnes Steel Division

Bristol, Connecticut

Associated Spring Corporation

5901

lector plate. This keeps them inside the grid where they're collected and measured. (2) Operation is stable particularly at ultra-low pressures. (3) A filament arrangement permits flash filament studies and estimates of pressures of 10^{-12} mm HG. The gage can connect to standard controls, but it's designed for a particular control cabinet. This measures 20-in. high, 23-in. wide, 18-in. deep. (NRC Equipment Corp.)

For more data circle No. 44 on postcard, p. 97

Parts Detector

Electronically, a new missing parts detector disengages a machine clutch when parts fail to eject. This insures against breakdowns and die damage. The detector consists of a sensitive spring wire assembly. It's completely automatic, requires no setting, supervision, or adjustment. (Wintriss, Inc.)

For more data circle No. 45 on postcard, p. 97

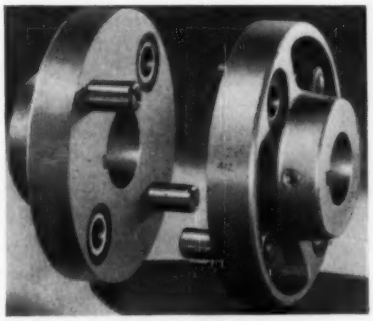
Control Meter

A miniaturized control meter operates without contacts at set points. As a result, pointer movement doesn't stop at set points. The full scale range of the meter thus is available for readings at all times. Typical uses: automatic control, alarm and warning, level indicator systems. (International Instruments, Inc.)

For more data circle No. 46 on postcard, p. 97

Flexible Couplings

Flexible couplings in a new series are for use on direct-driven ma-

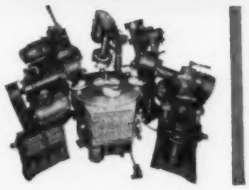


chinery where torque is not excessive in relation to shaft diameter. Couplings use steel studs and rubber cushioned sleeve bearings. The four studs and sleeve bearings provide positive, resilient drive. No lubrication is necessary. Cast semi-steel flanges are accurately machined on the periphery and face to simplify checking alignment with a feeler gage or straight edge. Couplings are made in four sizes with 1¼, 1¾, 2¼ and 2¾ in. maximum bores. (Ajax Flexible Coupling Co., Inc.)

For more data circle No. 47 on postcard, p. 97

Aluminum Coating

Corrosion resistant, a new aluminum insulation covers and protects pipe elbows, etc. It's for use where corrosive fumes and sprays might damage an untreated aluminum covering. Exterior and interior surfaces are treated by spraying and baking on the black colored epoxy resin. Matching jacketing with a corrosion resistant finish also is available. Tests on the epoxy



Hammond Automatic Deburring Machines will increase production, assure a uniform finish, reduce operator fatigue and save floor space.

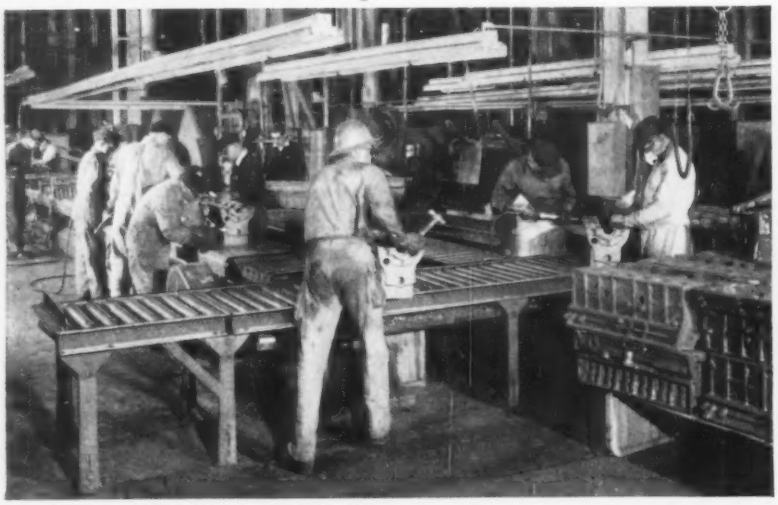
Send sample parts for complete engineering report.

Hammond Machinery Builders INC.

1612 DOUGLAS AVE. KALAMAZOO, MICH.

Ask Standard

how to cut costs with conveyors



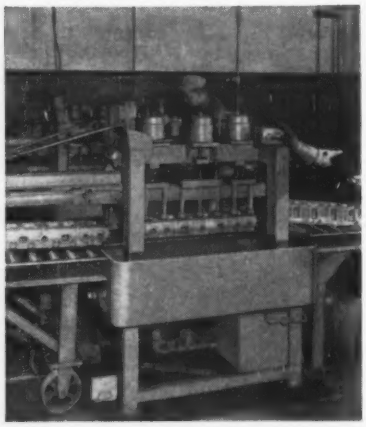
Cylinder blocks are chipped, ground and inspected on Standard Roller Conveyor line.

Eastern foundry simplifies cylinder block handling with roller conveyors

HERE'S another installation in which Standard Roller Conveyors are keeping heavy, bulky components flowing to machining and assembly points with minimum manpower and practically no time loss.

Easy to set up and exceptionally sturdy, Standard Roller Conveyors (live or gravity) can also be job-tailored to your specific materials handling problem — permanent or temporary.

And roller conveyors are only one of the many types of Standard conveyors. Others include belt, slat, chain, pushbar or sectional conveyors as well as spiral chute systems.



Standard Roller Conveyors are available from stock in a wide range of roller diameters, centers and frames.

Why not take advantage of Standard's half-century of conveyor application experience. Consult STANDARD CONVEYOR COMPANY. General offices: North St. Paul 9, Minnesota. Sales and service in principal cities.

Call the Standard engineer listed in your classified phone book or write direct for Bulletin 68 — Address Dept. M-3.

Standard

OVER 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

protective coat at 400°F show no embrittlement or softening of film. A 1000 hour test in both a salt spray cabinet and a weatherometer resulted in no film breakdown. The insulation has a 2-in. overlap be-

yond the turned section; this assures a positive closure with straight sections of jacketing. Installation is made with metal holding screws. (Preformed Metal Products Co.)

For more data circle No. 48 on postcard, p. 97

Aluminum-Copper Wire

Aluminum-clad copper wire has use as high-temperature magnet wire. It also can be an electrical conductor in aircraft, missiles or other high-speed equipment. Aluminum measures about 40 pct of the cross-sectional area. At room temperature wire conductivity is reported close to 70 pct that of copper. (Sylvania Electric Products Inc.)

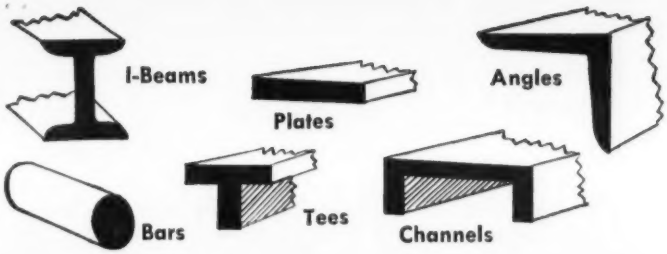
For more data circle No. 49 on postcard, p. 97

Gear Pumps

Pressure-balanced hydraulic gear pumps operate at pressures to 2500 psi. The pumps come in 14 sizes, four styles. Outputs range from 1 to 60 gpm. Available for clockwise or counter-clockwise rotation, they have a cast aluminum housing.

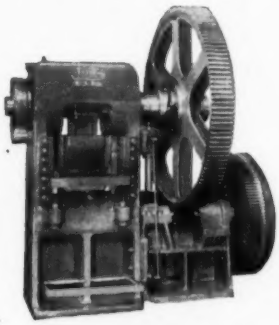
Typical uses: materials handling and farm equipment, dump trucks, roadbuilding machinery, machine tools, presses. (Berry Hydraulics Div., Oliver Tyrone Corp.)

For more data circle No. 50 on postcard, p. 97

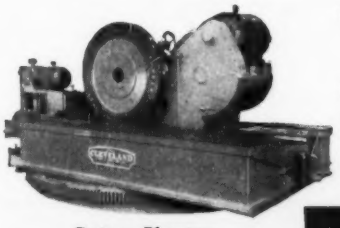


If you bend, roll, shear, punch, plane or straighten any of these shapes of metal— save time and money with

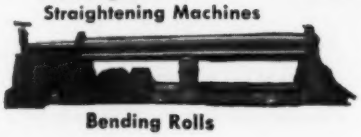
CLEVELAND
FABRICATING TOOLS


Bar Shears

Angle Shears


Rotary Planers

Bending and Straightening Machines

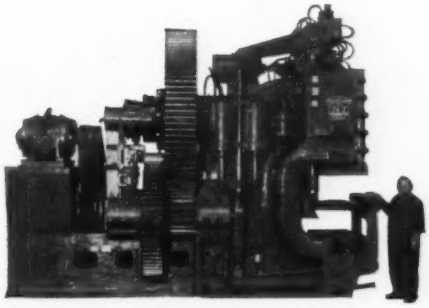

Bending Rolls

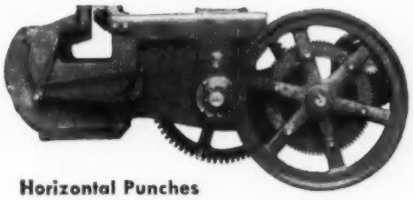
Simple to operate, ruggedly built, Cleveland Fabricating Tools are designed for efficient, trouble-free operation and years of service.

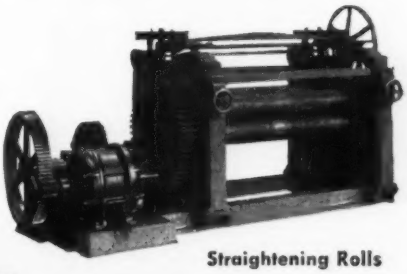
Leading shipyards, railroads, bridge builders, boiler makers, and other structural steel and heavy plate fabricators have proven the dependable, economical performance of Cleveland Fabricating Tools.

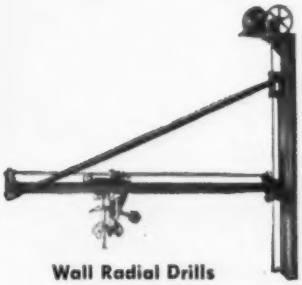
Since 1880, Cleveland has engineered its complete line of fabricating tools to be the finest, most efficient for punching, shearing, bending, rolling, straightening, planing, coping and notching I-beams, tees, zees, channels, bars, rods and other structural shapes.

Write for Folder FT48 to help you determine the correct fabricating tool for your needs. AA-7494


Vertical Open Gap Punching Machines


Horizontal Punches


Straightening Rolls


Wall Radial Drills

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

Offices NEW YORK, DETROIT, CHICAGO, PHILADELPHIA, EAST LANSING, CINCINNATI

New Equipment and Machinery

Pneumatic Unit Works Metals at High Velocity

Delivering 40,000-ft-lb energy at 200-fps velocity, this machine works high-strength metals with ease. It adapts to forging, forming, extrusion, compacting, shearing, blanking and other jobs. Gas energized, the high-energy unit contains a heavy dynamic reaction plate held by three tie bars. This positions the die against which a piston reacts with ultra-high velocity and pressure. Its control console has one simple dial for the firing cycle and resetting. Small and compact, it can be bench mounted or secured to a concrete floor via four bolts. The unit works on the principle that many metals flow like plastic when worked at high velocity. Most jobs need no heated dies or lubricants. The unit comes in three sizes: 12-in. bore, 160,000-ft-lb energy; 6-in. bore, 40,000-ft-lb energy; 36-in. bore, 1,500,000-ft-lb energy. The 6-in. one measures only 2 x 9 x 2 ft. (Convair Div., General Dynamics Corp.)

For more data circle No. 51 on postcard, p. 97

Control Makes Sure Billets Get Exact Heating

Thanks to a precise control system, a new induction heating setup heats aluminum billets to exact temperatures for extrusion. The "metered btu" system measures watt-hour input to the billet with an integrating watt-hour meter. It determines, with a totalizing timer, the amount of energy the billet absorbs. A means of compensating for the starting temperature of the billet is provided. Thus, with a billet of known weight and known initial temperature, a predetermined amount of energy can be selected to heat the billet as desired. No prod type thermocouple is necessary. With low voltage power sources, smooth stepless power control results from use of saturable core reactors. This eliminates high contactor maintenance cost and provides control of the billet heating rate. (Lindberg Engineering Co.)

For more data circle No. 52 on postcard, p. 97

Horizontal Band Saws Tackle Rugged Jobs

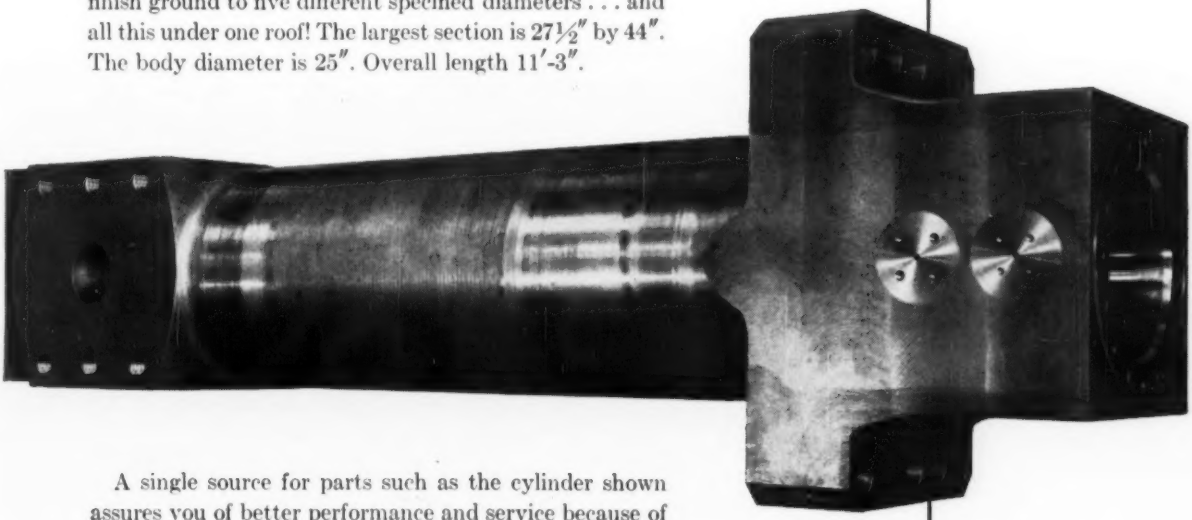
Cutting with the top portion of its saw band, this horizontal machine adapts to a variety of work handling devices. Using such devices, it can quickly, accurately cut off many diverse pieces. The heavy-duty power saw readily works bar stock, beam shapes, rough forged billets, pipe and many more shapes and forms in a wide variety of materials. Material waste is very low. What few chips it does make get carried off in its new chip conveyor system. Each basic machine includes a roller table on the "load" side of the saw band with or without power rollers. Up to 60 ft of powered conveyor tables can be added to both load and unload sides of the basic machine. Up to 10,000-lb capacity roller units are available. (The DoAll Co.)

For more data circle No. 53 on postcard, p. 97

"Forgings by Finkl"

...from blueprint to finished part

This is a side cylinder for a hydraulic press. It was made from a Finkl C 1035 electric furnace steel forging weighing 32,000 pounds. When shipped it weighed 14,850 pounds. Between the start and finish it had been heat treated, milled, turned, tapped, and the inside bored and finish ground to five different specified diameters . . . and all this under one roof! The largest section is 27½″ by 44″. The body diameter is 25″. Overall length 11′-3″.



A single source for parts such as the cylinder shown assures you of better performance and service because of greater quality control through each step of its processing.

"Forgings by Finkl" is synonymous with highest quality. Finkl custom forgings have the stamina and fatigue resistance to withstand the severe strains and torsional stresses encountered in modern heavy duty machinery. We also produce repair parts for all types of forging equipment; containers, liners, and plungers for extrusion presses; plastic molds; and die casting steels.

Next time you are thinking of forgings, think of Finkl. The best costs the least in the long run.

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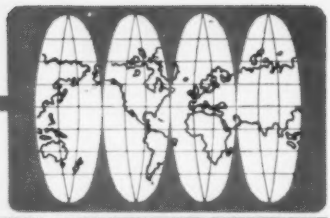
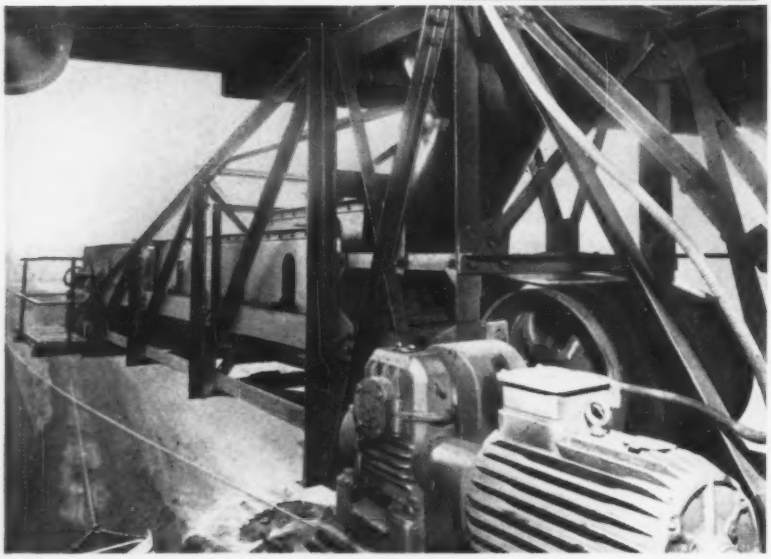
DAVID BROWN

at work around the world





Radicons drive coal feed conveyors at one of England's largest power plants

WHY O.E.M. INSTALLATIONS ACCOUNT FOR 85% OF RADICON SALES

In Europe, Africa, South America, Australia, Canada and the U. S., Radicon speed reducers are harnessing motor speeds into working power for all industry.

From missile launchers to supermarket check-out counters, product design engineers have come to know the important 1-2-3-4 reasons why Radicons are specified on so many different industrial applications—and why OEM installations account for 85 percent of the David Brown Radicon sales.

1. PRICE—The original equipment manufacturer is always fully protected on the industry's accepted discount, *and* Radicon drives are still competitively priced at the user level.

2. RELIABILITY—Trouble-free operation under all operating extremes.

3. PRODUCT LINE—A Radicon in the size, type and ratio for every job.

4. DELIVERY—Off-the-shelf on Radicons in 14 sizes, 1⅛" to 14", 8 types, 17 ratios from 5:1 to 250:1.

Get the details on the cooperative service of David Brown companies around the world—on the next installation!

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(one of the David Brown Industries)

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6025 Atlantic Blvd., Maywood, California
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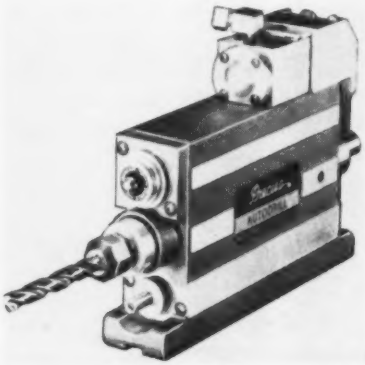
NEW EQUIPMENT

Compact Driller

Very small in size, this air-hydraulic automatic drill unit is electrically actuated. It's just 2-in. wide, 12 long, 7 high, not including motor. It mounts in any vertical or horizontal position on 2-in. centers. The unit develops three times line



pressure in thrust. Drilling capacity is 5/16-in. steel. Stroke is 1½-in. Depth accuracy is 0.001 in. with no dwell required. Spindle speeds run up to 6000 rpm. Recommended motor sizes include ⅓ to ½ hp. (Precise Products Corp.)

For more data circle No. 54 on postcard, p. 97

Gas Producer

Producing Ammalene gas for heat treatment, etc., a new generator comes in ratings from 500 to 8000

cfh. Ammalene is a low-cost substitute for hydrogen. Residual ammonia in gas it turns out is 0.05 pct

Youngstown tin plate

will help feed the families of her day

Automized, round-the-clock canning of foodstuffs in *her* day will feed more families than the world has ever known. Youngstown, today, is anticipating tomorrow's need for tin plate —in increasing quantity and quality. Continuing advancements in facilities, the result of tin plate research, make certain that millions of families in *her* day will enjoy the finest of food... *packaged in Youngstown tin plate.*

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Manufacturers of Carbon, Alloy and Yoloy Steel
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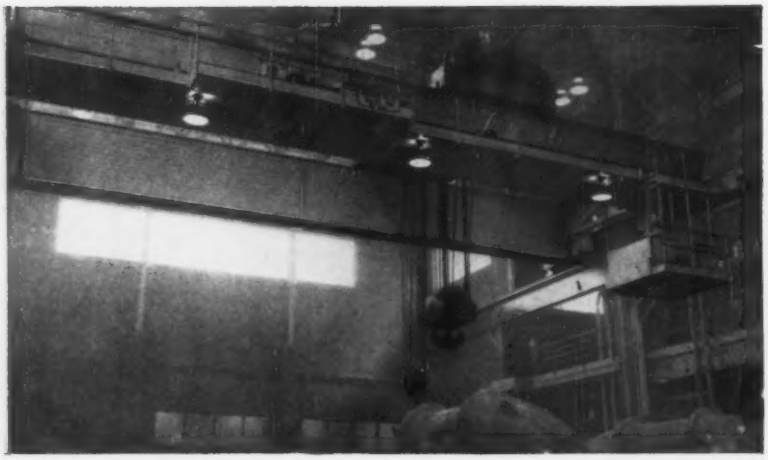
SHEPARD NILES

LARGE INDUSTRIAL CRANES

LIFTING POWER

1 to 450 TONS

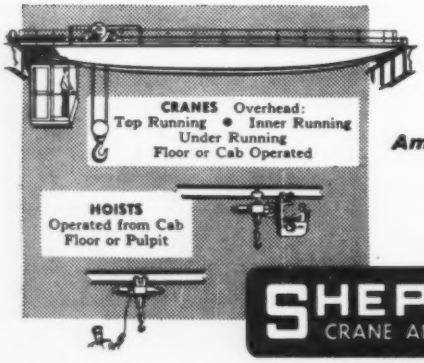


Shepard Niles places dependable lifting power at your fingertips . . . effortless power that now serves thousands of plants throughout America.

Eliminate costly ground-level handling of materials—going around men, materials and machines. Go UP and OVER, smoothly and safely through the air, directly to your destination . . . leaving **more room for production and storage.**

Shepard Niles offers you a **complete** line of heavy industrial cranes from 1 to 450 tons for constant or intermittent duty in slow, medium and high speeds; operated from cab or floor.

Send for Industrial Crane bulletin today . . . or ask that a Shepard Niles representative call at your plant—there's NO OBLIGATION.



Building America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

1490 Schuyler Ave., Montour Falls, N. Y.

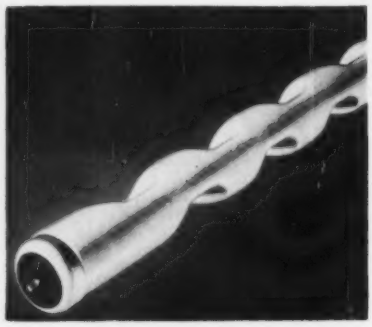
NEW EQUIPMENT

or less, with —40 to —60°F dew-point. The equipment provides an extremely pure atmosphere of hydrogen and nitrogen. It maintains constant analysis of the gas. The complete packaged unit is pre-piped and pre-wired; only contactors need wall mounting. Fully automatic, it requires no cooling water when operating from a liquid ammonia supply. (General Electric Co.)

For more data circle No. 55 on postcard, p. 97

Fluorescent Lamp

Some 15 pct more light from the same size tube results from a new grooved fluorescent light. Alternate grooves put the glass surface closer to the arc. This increases bright-

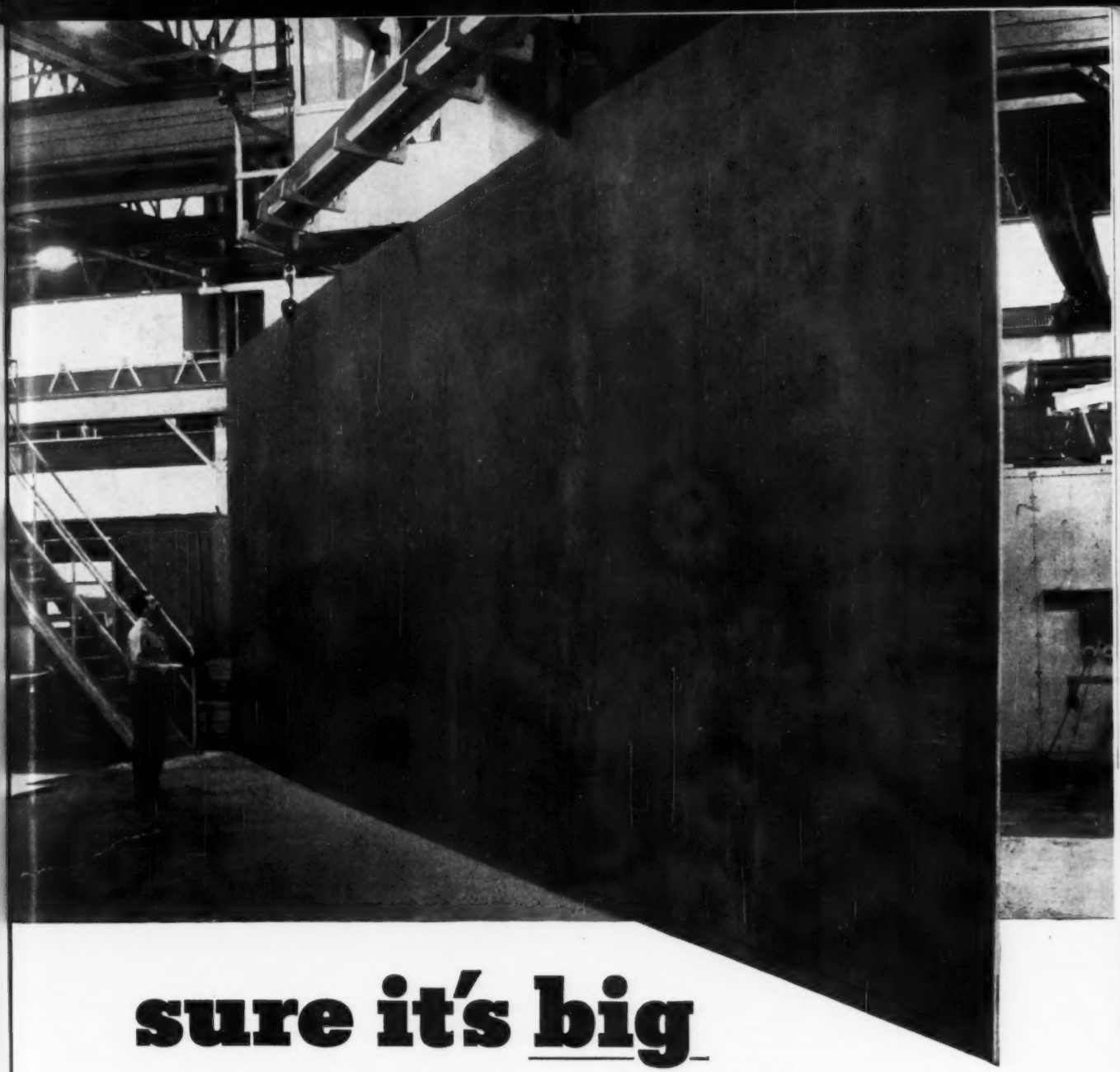


ness. It also gives an 8-ft lamp the equivalent of a 9-ft one. Price is same as previous types. Units will soon be available in 8 , 6, and 4-ft lengths. (Large Lamp Dept., General Electric Co.)

For more data circle No. 56 on postcard, p. 97

Tumbling Media

Discoloration, impingement and media fracture are virtually eliminated with new barrel finishing media. Featuring a new shape, a truncated triangular pyramid with sharp edges and acute angles, the media work into radii not reached by other types. Cutting speed of the new shape—composed of aluminum oxide mineral anchored in a binder—is up to 12 times that of some other media. In addition to fast cutting, the shape reduces workpiece surface contamination by



sure it's big

. . . but not particularly big or unusual

in Carlson's production of stainless steel plate

IT was normal, but not easy, for Carlson specialists to handle this big plate. Type 304-L stainless, it measured 7/16" x 131½" x 452 9/16" and weighed an impressive 7923 pounds. And when this big one landed at the customer's receiving dock it was *exactly* what he wanted . . . *right* by chemical composition, *right* by physical standards, *right* to specification and *right* to size.

Whatever you need in stainless steel—big plates, small rings, formed or cut-to-shape items—will be produced accurately and on time. Stainless steel is our *only* business, and we know it. That is why you can depend on Carlson to give you *what you want when you want it!* Your inquiry is invited.

G.O.CARLSON *Inc.*

Stainless Steels Exclusively

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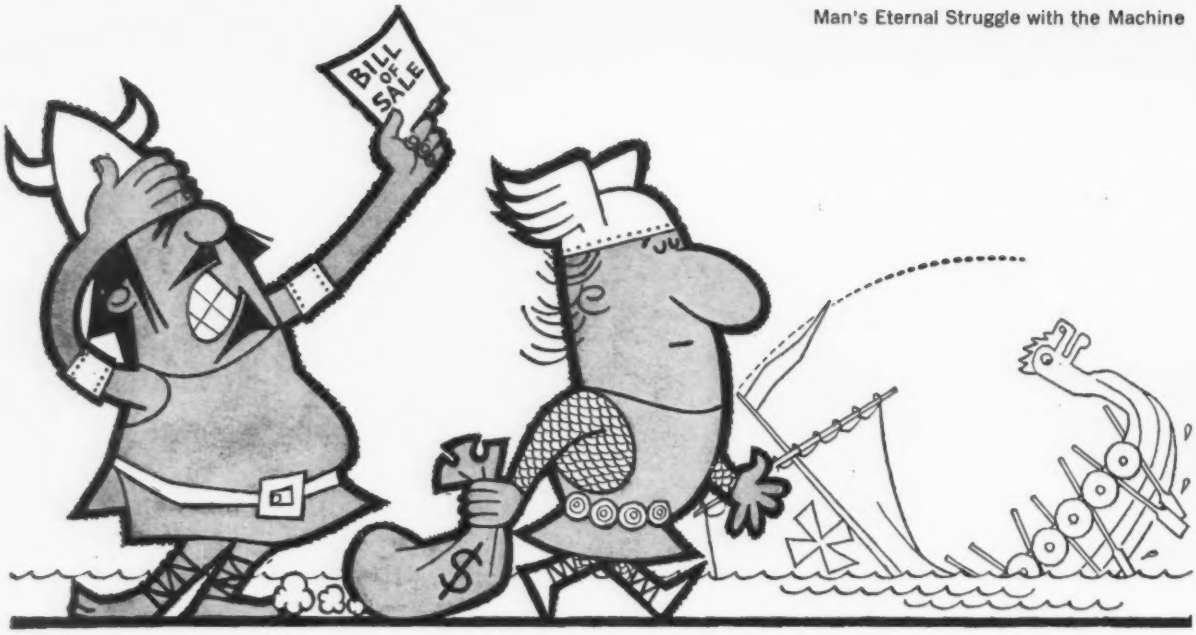
District Sales Offices in Principal Cities

PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS AND SHEETS (No. 1 Finish)

Man's Eternal Struggle with the Machine



PRECISE DEPENDABLE, AND CONSISTENT FABRICATING EQUIPMENT IS ESSENTIAL FOR PROFITABLE PRODUCTION

Where do equipment builders hide machines that won't work?

Far too many of them are hidden in customers' plants! And many successful men like yourself, who devise production processes and specify equipment, have gained invaluable experience from such painful, vendor mistakes.

But, regardless of the lesson involved, *your overhead* can't afford the lost production time and heavy expense while you rebuild, or test and prove the vendor's equipment for him. No matter how attractive the original price of the equipment, it's false economy if the price tag didn't itemize the extra money required to make it work right.

Sciaky has always accepted full vendor responsibility for delivering equipment *into production* according to your original specifications. That's why Sciaky resistance welding and production equipment is thoroughly tested and proved to do your particular job *before shipment.* That's why Sciaky equipment is commonly installed, qualified, and certified to the most rigid welding specifications in a minimum of time after delivery.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

Manufacturers who must satisfy the highest requirements of dependability, consistency, and performance for either research and development or production take that advantage.

Documented case histories of manufacturers who have taken full advantage of Sciaky Techniques of Resistance Welding are presented in the publication "Resistance Welding at Work." Write for copies and advise your field of interest.

SCIAKY

69A

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metallic or mineral residue. It produces a light color on the workpieces. Cleanliness of the shape is due largely to its lack of porosity and its non-wetting property. It repels water-suspended materials such

as dirt and metal particles. This leaves the entire abrasive surface free to contact the workpiece surface. (Minnesota Mining & Mfg.

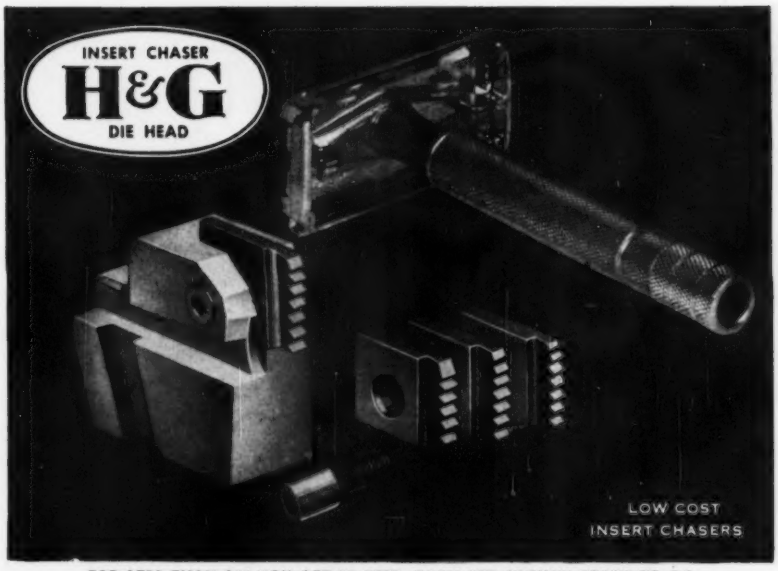
For more data circle No. 57 on postcard, p. 97

Lapping Machine

For lapping air brake valve parts and similar items, a new setup employs a five-station lapping attachment. This radially mounted fixture permits lapping of valve faces on the lapping table while

reciprocating blocks internally lap the valve seats. When the small lapping blocks go out of flat, they are brought into perfect flatness by reconditioning on the lapping table. (Crane Packing Co.)

For more data circle No. 58 on postcard, p. 97



FOR LESS THAN $50 YOU GET 12 SETS, EACH SET GROUND READY TO GO

Men would not accept either idea at first . . .

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $50 you get a dozen sets of ¾—16 insert chasers, each set ground, ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.
FREE: "UNIFIED AND AMERICAN SCREW THREAD DIGEST"

THE EASTERN MACHINE SCREW CORPORATION, 21-41 Barclay Street, New Haven, Conn.

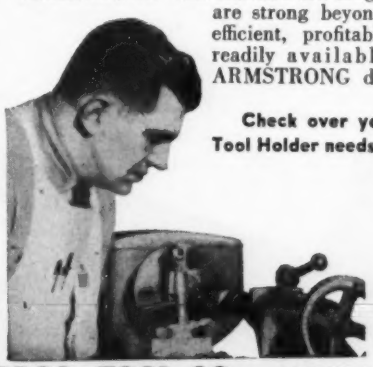
ARMSTRONG

TOOL HOLDERS

A Correct Tool for Every Lathe Operation

You can save time (and money) by ensuring that your machine tools are equipped with *adequate numbers* of the correct ARMSTRONG Tool Holders. The ARMSTRONG System of Tool Holders includes correctly designed tools for *every* standard operation on lathes, shapers, and planers, and for many operations on turret lathes and screw machines. By utilizing the ARMSTRONG System of Tool Holders, you can reduce tooling costs, eliminate down time in tooling up, operate your machine tools at maximum feeds and speeds.

ARMSTRONG Tool Holders are long-lasting tools. They are strong beyond need, handy and efficient, profitable to use, and are readily available from your local ARMSTRONG distributor.



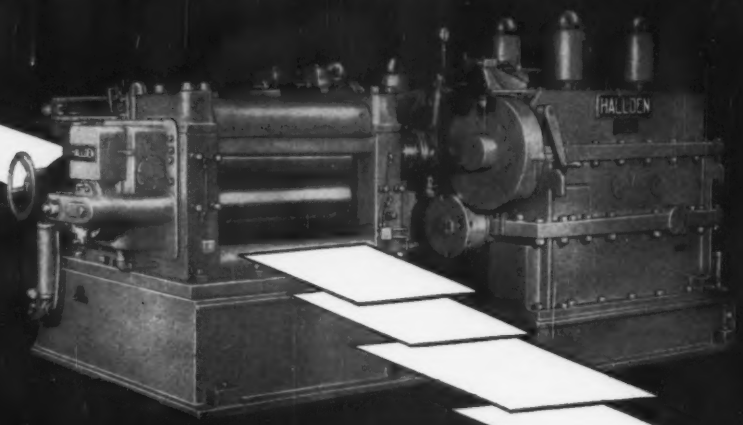
Check over your ARMSTRONG Tool Holder needs. Write for literature.

If you do not know the name of your local ARMSTRONG Distributor, inquire when asking for literature.

ARMSTRONG BROS. TOOL CO. 5209 W. ARMSTRONG AVE CHICAGO 46, ILL

NOW - A NEW "*Push Button*" FLYING SHEAR

NO DOWN TIME to change cut length or synchronization



A HALLDEN SHEAR EXCLUSIVE

A major improvement in high production continuous strip process in-line shearing.

Revolutionary new designs now permit synchronization adjustment AND gear changes to be made without stopping production. Changes in cut lengths are made in just seconds.

Hallden Shears can be furnished in processing lines built by leading machinery manufacturers the world around.

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THE SHEARING SPECIALISTS

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Associates: The W. H. A. Robertson & Co. Ltd. Bedford England

The Iron Age Summary

Will Steel Labor Extend Pact?

Chances are the United Steelworkers will refuse to work without a contract.

It's a tradition with the steel union. And it's not likely to abandon it without assurance that it will benefit.

▪ Steel labor isn't likely to extend its contracts with steel companies beyond the June 30 expiration date.

The United Steelworkers of America has a traditional policy of refusing to work without a contract. The union won't abandon this policy without assurance that it would be to its advantage.

Wishful Thinking — Speculation that the steel union might forego its right to strike if negotiations for a new contract become deadlocked is little more than wishful thinking. It has absolutely no basis in fact.

Contract extensions would be a sure sign of union weakness. Furthermore, it would enable steel users to build inventories to the point where a subsequent strike threat would be almost meaningless.

McDonald's Too Smart—David J. McDonald, president of the steel union, is too smart to put himself and his members in such a vulnerable position.

Mr. McDonald's reaction to Sen. Kefauver's suggestion that steel labor limit its demands to the average rise in steel productivity is a tip-off that contract negotiations this year will be as tough as they ever were.

Head-on Clash Brewing — Mr. McDonald indicated he wanted no part of a formula that would tie his hands during negotiations. He'll go after everything he can get from the steel companies. This attitude will run head-on into the steel industry's determination to hold the line on wage and fringe increases, and thus help stem inflationary forces.

And here's another angle: The mills themselves would not relish the idea of working without a contract. There would always be the danger of wildcat strikes and the risk of damage to expensive mill equipment.

Market Grows Tighter — Meanwhile, the steel market continues to tighten on the basis of strike hedging and general improvement in business. Steel users are laying in as much inventory as they can, and will continue to do so between now and June.

Purchasing agents are finding it increasingly difficult to line up sources of supply for first half delivery. The mills are carefully screening all orders on the basis of each customer's past requirements. They're also trying to sift out suspected duplicate orders from users who normally buy from other mills.

Railroads Come Alive—Even the railroads are now getting into the act after months of hand-to-mouth buying. A pickup in freight car orders has brought a sharp improvement in demand for railroad steel. It's estimated that new freight car orders will total between 5000 and 6000 for February. This compares with 4000 placed in January.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,547	2,506	2,293	1,425
Ingot Index (1947-1949=100)	158.6	156.0	142.8	88.7
Operating Rates				
Chicago	91.0	90.0	85.0	58.0
Pittsburgh	89.0	86.5*	76.5	55.5
Philadelphia	96.0	94.5*	90.0	57.0
Valley	92.0	91.5*	78.0	44.5
West	86.0	86.0	86.0	74.0
Cleveland	89.0	91.0*	85.0	34.0
Detroit	99.0	93.0*	77.0	44.0
Buffalo	102.0	102.0	100.0	37.0
South Ohio River	94.0	95.0*	92.0	28.0
South	81.0	81.0	72.5	51.5
Upper Ohio River	95.0	94.0*	85.0	67.5
St. Louis	87.0	85.0*	83.0	79.0
Aggregate	90.0	88.5	81.0	52.8

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$41.83	$43.17	$43.83	$37.67
No. 2 bundles	$30.00	$30.33	$30.33	$28.50
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	28.10
Copper, electrolytic	30.00	30.00	30.00	25.00
Lead, St. Louis	10.80	11.30	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	104.25	104.125*	101.00	94.75
Zinc, E. St. Louis	11.00	11.50	11.50	10.00

Soft Market Aids Valve Buyers

Valve makers are beating the bushes for customers. Price inducements are common.

Some steel strike scare buying is cropping up, but it's far from a stampede.

▪ A valve buyer today has the market at his feet.

Delivery of standard items can be made off-the-shelf. No general price increase is in sight. And by shopping around, a buyer can do as well as list price less 35 pct, depending on the quantity and type of valve he wants.

Inducement Buying—The valve market has weakened considerably in the past few months. There is some "inducement" buying going on at present—due to the possibility of a steel strike this summer—but it's not enough to create a valve shortage.

Beyond this summer, many valve makers are preparing for a further deterioration in the market.

Customer Hunters — Manufacturers are trying to pick their spot, so to speak, in making sales. Depending upon their inventory of metal, and conditions in their factories, they will seek a customer who wants what they can easily supply.

If a producer is overstocked with cast iron, for instance, and has idle gate valve capacity, he will look for a customer who wants cast iron gate valves. Frequently, it means a better-than-usual price for the buyer.

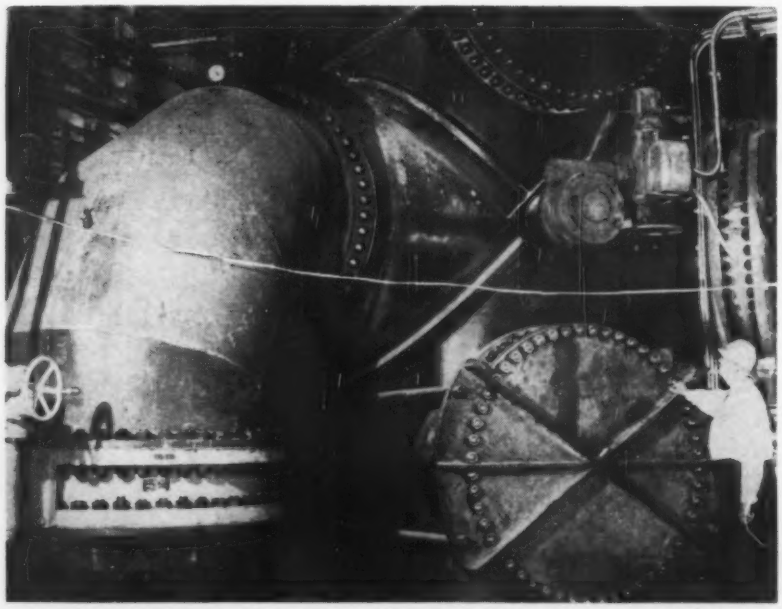
Delay for High Pressure—While delivery on standard items is no problem, you can expect a delay if you're ordering high pressure valving—in the 900 to 1500 psi range.

One example of quantity valve purchasing, and the planning required to make it come off smoothly, is the experience of Burns and Roe, Inc. This engineering firm designed and supervised construction of the Thomas H. Allen generating station at Memphis, Tenn., reportedly the largest steam power plant ever authorized at one time by any municipality.

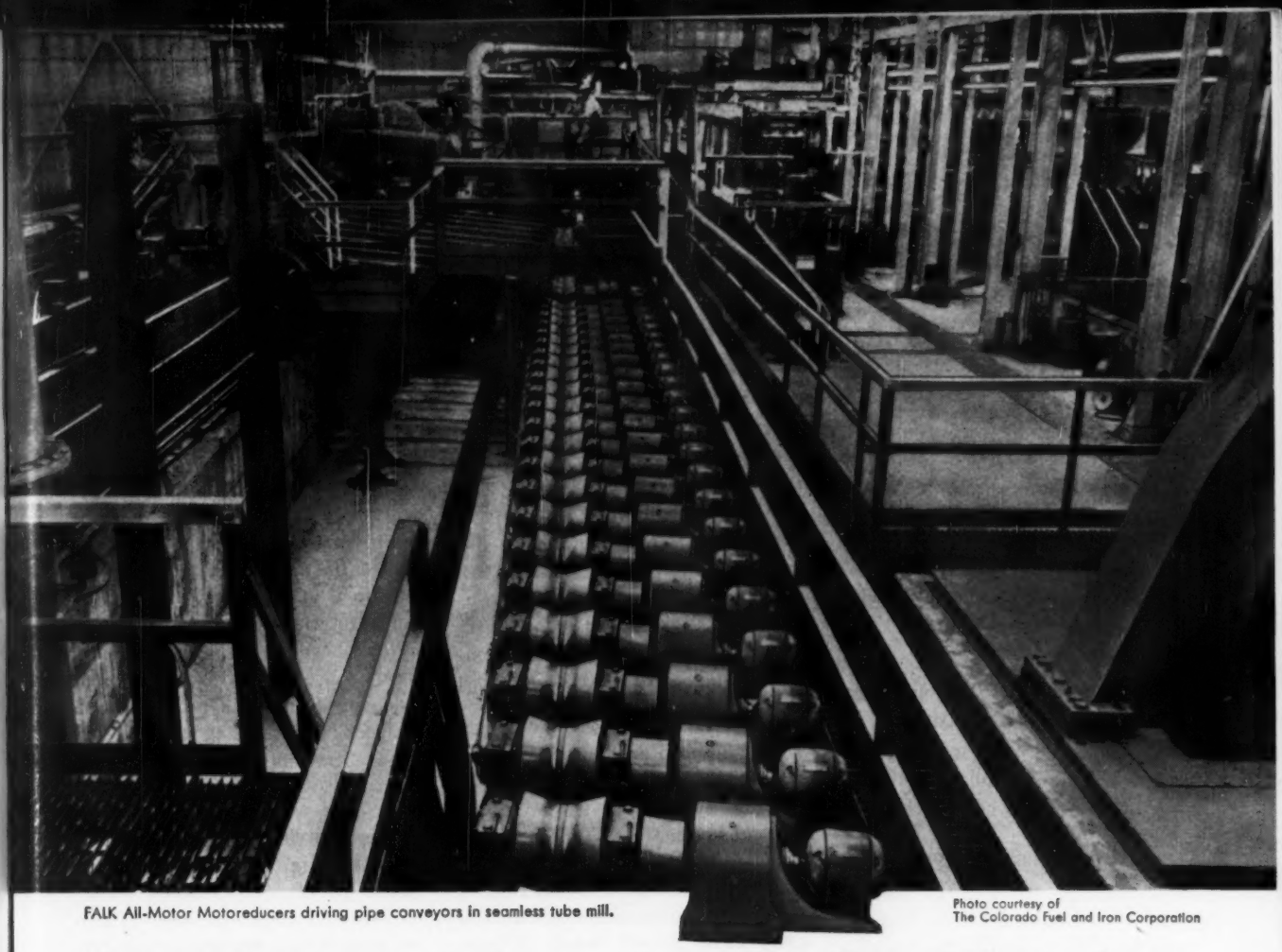
Worth $1.5 Million—Over 8000 valves have gone into the plant, which is scheduled for completion this year. The valves range in size from two 16-ton reversing valves down to ¼-in. instrument valves. Their total value is calculated by Burns and Roe at $1.5 million.

Due to the large volume, longer lead times were needed. Burns and Roe began ordering special valves 16 months in advance. And while the plant consisted of three units, and only one unit was being built at a time, it was found advisable to run all the valves for the three units at one time.

Big Seller — About the most popular standard valve is the pressure seal bonnet design, which was first introduced about eight years ago. Its weight saving, and metal saving, features — especially for larger valves—have made it a big seller.



VALVE GIANT: An 18-ft high, 16-ton reversing valve is installed in a condenser intake line at the new Thos. H. Allen generating station in Memphis. The designing engineers, Burns and Roe, Inc., estimate there are more than 8000 valves of assorted sizes and types in the plant.



FALK All-Motor Motoreducers driving pipe conveyors in seamless tube mill.

Photo courtesy of
The Colorado Fuel and Iron Corporation

You get these "extras" when you buy FALK *all-steel* Motoreducers

1. **Freedom from damaged housings.** The exclusive FALK *all-steel* construction gives full protection from cracked housings or torn-off feet...plus twice the ability of cast iron to maintain vital alignment.

2. **12-15% reserve load-carrying capacity** in the gears, by AGMA standards. The extra-depth, high pressure angle helical gears are another FALK exclusive ...they assure better operation and longer gear life.

3. **Highest known gear efficiency**—98½% per gear train under full load! This means maximum productive work for your power dollar.

4. **Longer service life**...advanced FALK design makes it possible to machine both bores for each shaft assembly at one time, thus eliminating possible accumulation of tolerances that occurs when individually machined parts are assembled. The result—better alignment of revolving elements that permits units to transmit rated capacity longer.

5. **Standard units to fit your needs.** Integral and All-Motor® Motoreducers are available in horizontal, vertical and right angle types...a type for every use.

Units are available up to 75 hp; output speeds from 780 rpm down to 1.2 rpm. Prompt delivery from factory, warehouse or distributor stocks.
Ask your FALK Representative or Authorized FALK Distributor for *Bulletin 3100*.

THE FALK CORPORATION, MILWAUKEE 1, WIS.
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS
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FALK
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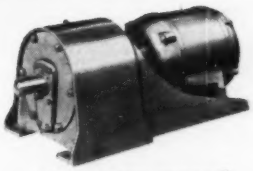
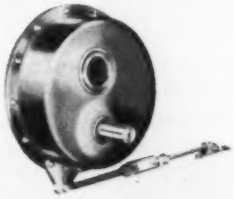


THE FALK ALL-MOTOR® MOTOREDUCER
the original All-Motor unit
(Shown) Horizontal concentric model. Also available in right angle and vertical types.



THE ALL-STEEL FALK® SHAFT MOUNTED DRIVE
Proved best for the countless industrial applications where a reducing unit mounting directly on shaft of the driven machine is indicated.
Units from 1/2 to 50 hp. Ratios —4:1, 14:1 or 24:1. Torque capacity up to 41,000 lb-in (in standard units). Prompt shipment from stock. For details, ask for ***Bulletin 7100***.

Buyer Worry Mounts As Market Tightens

In the rush to build inventories, steel users are running into headaches.

Principal problems: Closing mill order books, longer deliveries, and shipping jams.

▪ Buyer headaches are mounting as the steel market tightens.

Principal causes for concern are: (1) rapidly closing mill order books, (2) delivery stretchouts, and (3) shipping delays.

Second quarter books are now filling fast on bar and oil country products. Demand for oil country seamless, in particular, has zoomed in the last few weeks.

One seamless mill had its March books full by the first of the month. It expects to close April books by March 15. And May tonnage should be sold out about a week later.

Bar deliveries are moving out as the mills operate under full schedules. Formerly some bar shapes were rolled about every other week. Now, with mill rolling cycles extended, they are produced once a month.

Even after users get their steel rolled it still must be delivered. And transport woes are increasing. Demand for railroad gondola cars is tightening. This, in turn, steps up interest in flat bed trucks which are already scarce.

The railroads are finally moving ahead with car building programs. (See below.)

Railroad Steel — A pickup in freight car building programs has increased demand for railroad steel. The Pennsylvania Railroad has announced plans for 11,500 new cars. The New York Central and the Illinois Central are also boosting building programs. One source estimates 5000 to 6000 new cars were ordered in February. This compares with only 4000 in January.

Sheet and Strip—Mill books on sheet and strip are buttoned up for the first half. Some producers, expecting heavy carryovers into June, are not guaranteeing June delivery. Secondary sheets are very scarce and those available command a high price. Some users of specialty strip have placed orders through August with mills not subject to strikes.

Electrical Steel—Jones & Laughlin Steel Corp. is entering the electrical steel market with a line of carbon electrical steels made in basic oxygen furnaces. The new line —first marketed electrical sheets made this way—will be sold under the trade name "Jalox." It consists of three grades of non-silicon bearing motor grades of electrical sheet. Two of these will compete with existing materials. The third will be a new carbon steel "promising the full benefits of magnetic performance . . . of steel made in basic oxygen furnaces."

Pipe and Tubing—Oil country seamless is rapidly moving into the sold-out class. Sizes in the 4 to 8 in. range are especially scarce. Butt-weld and continuous weld pipe remain in good supply. Large line-pipe is still available for first half delivery, but mills are starting to demand firm orders from buyers.

Export Prices—U. S. Steel Export Co., effective March 1, reduced base prices. The reductions followed cuts in railroad freight rates to North Atlantic seaports. Export base prices on semi-finished steel, rails, and wire rod remain unchanged. Tin mill products were reduced about $2.40 a ton. All other products were cut $1.20 a ton.

Steel Service Centers—Distributor sales in February increased about 10 pct over January levels. Warehouses report a sharp pickup in sheet orders. Some continue getting requests to fill mill-size orders. Pittsburgh area service centers have increased their net prices on large quantities of galvanized sheet.

Iron Ore Prices—Lake Superior district iron ore prices probably will stay at present levels for the third straight year. Any price announcements are usually made by mid-February. This deadline has come and gone without any action.

Pig Iron—Demand is moving up as buyers build stocks. Some foundries at Chicago are reported aiming at a 60-90 day inventory by July 1. As a result pig iron sales there are up as much as 20 pct while foundry business has improved about 10 pct.

Bar—Mill books are just about filled solid for the first half. Some barmakers are using alloy mills to roll carbon bar products. Reinforcing bar users are building inventory.

PURCHASING AGENT'S CHECKLIST

Steelmakers may be set for another capital equipment spending spree. **P. 37**

Computer sales could triple in next decade. **P. 59**

How to get more for your metalworking dollar—adhesives. **P. 75**

COMPARISON OF PRICES

(Effective March 3, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Mar. 3 1959	Feb. 24 1959	Feb. 3 1959	Mar. 4 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	6.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloy blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

	March 3 1959	Feb. 24 1959	Feb. 3 1959	March 4 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$45.50*	$46.50	$47.50	$37.50
No. 1 steel, Phila. area	*38.50*	39.50	39.50	38.00
No. 1 steel, Chicago	*41.50*	43.50	44.50	37.50
No. 1 bundles, Detroit	*38.50*	39.50	40.50	31.50
Low phos., Youngstown	*48.50*	49.50	49.50	41.00
No. 1 mach'y cast, Pittsburgh	51.50	51.50	51.50	51.50
No. 1 mach'y cast, Phila.	49.50**	49.50**	49.50**	48.50
No. 1 mach'y cast, Chicago	*56.50*	57.50	56.50	48.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$41.83*	$43.17	$43.83	$37.67
No. 2 bundles	*30.00*	30.33	30.33	28.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	25.00
Copper, Lake, Conn.	30.00	30.00	30.00	25.00
Tin, Straits, N. Y.	**104.25†**	104.125*	101.00	94.75
Zinc, East St. Louis	*11.00*	11.50	11.50	10.00
Lead, St. Louis	*10.80*	11.30	11.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised. ** Corrected.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Scrap Prices Drop, Ingot Rate Climbs

The scrap market is straying from its historical pattern. It has many perplexed.

The answer is in readjustment to the recession and improved steelmaking methods.

▪ The scrap market paradox continued into its second week. Prices buckled again while the steel operating rate climbed into the 90's.

This seeming contradiction to past patterns has its roots in the recession of 1958. Many mills were caught with large scrap inventories which gave them a buffer when the current steel boom started. Many also took advantage of last year's lull to improve their steelmaking efficiency. Both these factors have allowed them to put off purchasing new scrap for a longer period than normally would be the case.

Now the mills are nibbling away at dealer resistance $1 to $2 at a time with spot orders for scrap. Adding to dealer anxiety has been the ability of consumers to buy industrial scrap at lower prices.

But there are signs that the consumers may soon lose the upper hand. In Cleveland, for instance, most factory lists went to local mills this month. Last month, most industrial scrap was shipped out of the Cleveland area. It indicates mill inventories are dropping fast.

Spot orders at lower prices in the three major districts sent The IRON AGE No. 1 heavy melting Composite Price down $1.34 to $41.83.

Pittsburgh — The market slipped another notch as factory bundles fell $1 to $2 from last month's lists and No. 1 heavy melting dropped $1. Prices of No. 2 openhearth grades are unchanged. For the most part, the dealer market is firm at present levels. Mill buying is still restricted to spot purchases. This practice has held prices down and produced a condition where sellers are plentiful.

Chicago—Attempts by local mills to pull prices downward have had some degree of success. The entire list in this market is down $1-$2, with the single exception of stainless scrap.

Philadelphia — A local mill placed spot orders for No. 1 heavy melting at $39, or $1 under last week's price. Same mill also bought No. 2 heavy melting at $34, a drop of $3. Export is helping keep the market alive. Upriver pipe foundries placed new orders for cupola cast at the quoted price. No. 1 machinery cast has been unchanged at $49-$50 since Jan. 27. Price shown in "Comparison of Prices" should have been $49.50 each week since that date.

New York—Steelmaking grades have dipped $1 a ton on the basis of small purchases of No. 1 heavy melting and No. 2 bundles by a consumer in an adjacent district. One broker is reportedly trying to drive No. 2 heavy melting down further. Stainless grades are up $5 a ton except for 430 turnings which are unchanged.

Detroit—The local market entered the week in a confused state. When industrial lists closed last week prices were "all over the map." No. 1 industrial bundles averaged about $36, down $1-$2.

Cleveland—Market is off $1 as mills continue to turn a cold shoulder on dealer offers. Local auto lists were widely distributed and sold for $2 under a month ago. This time, most tonnage found a home while last month a large amount went out of district.

St. Louis — Openhearth scrap prices are holding steady, but the outlook is uncertain. Railroad grades weakened slightly. No. 1 railroad heavy melting is off $1 at $45 to $46.

Birmingham — Purchases are limited and scattered and most prices are unchanged. Brokers report soil pipe manufacturers in Anniston and Chattanooga are stepping up tonnages while local pressure pipe makers are buying only enough to meet present needs.

Cincinnati — Openhearth scrap prices are off $1-$1.50. But area mills are taking shipment of both primary and secondary grades, so market is in good balance.

Buffalo—The market has been marking time with no price changes. Dealers expect a sale of sizable tonnage soon at quoted prices or slightly lower.

Boston—The market continued quiet, but prices are holding steady. There is little action either domestically or in the export market.

West Coast—In anticipation of export business, the market firmed up this week. Some brokers are looking for higher prices. Domestic demand is marking time.

Houston—A lull in this market continues. The district mill still appears to be in a comfortable inventory position. Yard intake has been slowed somewhat because of rainy weather.

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SCRAP PRICES *(Effective March 3, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	45.00 to 46.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	26.00 to 27.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. punch'gs plate	51.00 to 52.00
Heavy turnings	38.00 to 39.00
No. 1 RR hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	225.00 to 230.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	125.00 to 130.00
410 turnings	50.00 to 60.00

Chicago

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. forge crops	53.00 to 54.00
Low phos. punch'gs plate, ¼ in. and heavier	50.00 to 51.00
Low phos, 2 ft and under	48.00 to 49.00
No. 1 RR hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	52.00 to 53.00
Rerolling rails	64.00 to 65.00
Rails 2 ft and under	60.00 to 61.00
Angles and splice bars	55.00 to 56.00
RR steel car axles	72.00 to 73.00
RR couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	49.00 to 50.00
Cast iron wheels	44.00 to 45.00
Malleable	57.00 to 58.00
Stove plate	46.00 to 47.00
Steel car wheels	52.00 to 53.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	25.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	35.00 to 36.00
RR specialties	45.00 to 46.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast.	38.00 to 42.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	38.50 to 39.50
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Low phos. 18 in. and under	47.00 to 48.00
Rails, random length	50.00 to 51.00
Rails, 18 in. and under	57.00 to 58.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	41.00 to 42.00
Drop broken cast.	49.00 to 50.00

Youngstown

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	20.50 to 21.50
Shoveling turnings	20.50 to 21.50
Low phos. plate	48.00 to 49.00

Cleveland

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	34.50 to 35.00
No. 1 dealer bundles	42.50 to 43.50
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	28.50 to 29.50
No. 1 busheling	42.50 to 43.50
Machine shop turn.	16.50 to 17.50
Mixed bor. and turn.	21.50 to 22.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	21.50 to 22.50
Cut structural & plates, 2 ft & under	50.00 to 51.00
Drop forge flashings	42.50 to 43.00
Low phos, punch'gs plate	43.50 to 44.50
Foundry steel, 2 ft & under	43.00 to 44.00
No. 1 RR hvy. melting	47.00 to 48.00
Rails 2 ft and under	59.00 to 60.00
Rails 18 in. and under	60.00 to 61.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	54.00 to 55.00
No. 1 machinery cast.	52.00 to 53.00
Stove plate	49.00 to 50.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	225.00 to 230.00
18-8 turnings	125.00 to 130.00
430 bundles	125.00 to 130.00

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 busheling	41.00 to 42.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	19.00 to 20.00
Low phos. plate	45.00 to 46.00
Structurals and plate 2 ft and under	49.00 to 50.00
Scrap rails, random lgth.	51.00 to 52.00
Rails 2 ft and under	61.00 to 62.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	44.00 to 45.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails, random lengths	48.50 to 49.50
Rails, 18 in. and under	54.00 to 55.00
Angles and splice bars	50.00 to 51.00
RR specialties	48.50 to 49.50
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	42.50 to 43.50
Cast iron car wheels	45.00 to 46.00
Rerolling rails	60.50 to 61.50
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	39.00 to 40.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft.	42.00 to 43.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	44.00 to 45.00
Rails, 18 in. and under	51.00 to 52.00
Angles and splice bars	44.00 to 45.00
Rerolling rails	56.00 to 57.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Clean chem. cast. borings	23.00 to 25.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	33.00 to 34.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	36.00 to 37.00
Drop forge flashings	35.00 to 36.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast.	36.00 to 37.00
Mixed cupola cast.	43.00 to 44.00
Automotive cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	33.00 to 34.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	$32.00 to $34.00
No. 2 hvy. melting	30.00 to 32.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 bundles	.... 22.00
Machine shop turn.	.... 15.00
Cast iron borings	.... 15.00
No. 1 cupola cast.	44.00 to 45.00

Los Angeles

No. 1 hvy. melting	.... $36.00
No. 2 hvy. melting	.... 34.00
No. 1 dealer bundles	.... 33.00
No. 2 bundles	.... 18.00
Machine shop turn.	.... 15.00
Shoveling turnings	.... 17.00
Cast iron borings	.... 17.00
Elec. furn. 1 ft and under (foundry)	.... 47.00
No. 1 cupola cast.	.... 43.00

Seattle

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 bundles	.... 22.00
No. 1 cupola cast.	.... 36.00
Mixed yard cast.	.... 36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	.... $34.50
No. 2 hvy. melting	.... 30.50
No. 1 dealer bundles	.... 34.50
No. 2 bundles	.... 25.00
Mixed steel scrap	.... 26.50
Bush., new fact., prep'd.	.... 34.50
Bush., new fact., unprep'd	.... 28.50
Machine shop turn.	.... 13.00
Short steel turn.	.... 17.00
Mixed bor. and turn.	.... 13.00
Rails, rerolling	.... 37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	.... $35.00
No. 2 hvy. melting	.... 32.00
No. 2 bundles	.... 22.50
Machine shop turn.	.... 15.00
Shoveling turnings	.... 20.00
Cut structural plate 2 ft & under	$42.00 to 43.00
Unstripped motor blocks	34.00 to 35.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	26.50 to 27.50

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Will Copper Users Take a Stand?

There has been some hedging, but better demand could eat up this excess metal.

Buyers must decide if they are going to risk driving the market still higher covering in case of strikes.

■ Within the next few weeks many copper buyers will have to decide whether to take a stand on the possibility of strikes.

Their inventories are approaching the point where they will be adequate, if there are no strikes in major U. S. copper installations this summer.

Watch the Signs — Buyers will have to just about fly blind because very little of real authority is known on chances of strikes. But what they decide will be pretty evident, pretty fast, in the U. S. copper market.

Here's the picture:

There is already hedging because at least some of the current demand wouldn't be there were it not for the possibility of strikes, and because buyers appear to have little regard for the price. The last hike in the custom smelter price to 31¢ per lb, had no effect on buying volume.

But fabricators can reasonably expect excess metal bought to date to be absorbed fairly soon by increased demand, even if there is no strike.

There is little doubt that custom smelters, and probably producers will raise their prices soon.

If Buying Booms—If buying continues to boom at the higher levels it will mean more purchasing agents are more afraid to face their manufacturing chiefs empty - handed, with demand rising, and copper producers struck.

This would likely mean even higher prices. U. S. consumers will have to top our 1.7¢ per lb tariff at least, in bidding against strong European markets. And it will make the market very vulnerable if there are no strikes.

Close to the Vest—If buying tends to level off it will likely mean the thought of warehouses bulging with too-high priced copper in a sagging market has prompted buyers to hold stocks at about current levels until the labor picture clears a bit more.

Demand would still be good and improving because of such bright markets as residential building.

Strikes always firm a market. But with this market poised between leveling off and taking off, Kennecott's labor troubles, at Hayden, Ariz., and in Chile, are likely to have more effect than usual. It could be the clincher in knocking some buyers off the fence.

The issue at Hayden is interim contract, until June 30, with the United Steel Workers. No pact now exists. Only USW is on strike but other unions won't cross the picket line. This will also be a problem this summer.

At Chile little is known except what started as a slowdown is now a full-blown strike.

Aluminum

In addition to helping probe, "How far is up?", Reynolds Metals Co. is getting ready to help see, "How far is down?".

The aluminum producer is designing the Aluminaut, an aluminum alloy submarine it expects to operate three miles and more below the ocean's surface.

J. Louis Reynolds, executive vice president, suggests several interesting possibilities with the vehicle. The most intriguing for the metals trade is to economically tap the vast store of minerals in the oceans' floor.

Tin prices for the week: Feb. 25 —104.75; Feb. 26—104.875; Feb. 27 — 104.75; March 2 — 104.375; March 3—104.25.*

*Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in January based on quotations appearing in THE IRON AGE, were as follows:

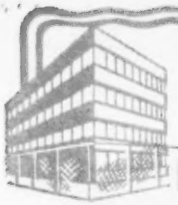
Electrolytic copper, del'd Conn. Valley	29.94
Copper, Lake	29.94
Straits Tin, New York	102.785
Zinc, E. St. Louis	11.42
Lead, St. Louis	11.42
Aluminum ingot	26.80

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum Ingot	26.80	26.10	8/1/58
Copper (E)	30.00	29.00	2/3/59
Copper (CS)	31.00	30.50	2/24/59
Copper (L)	30.00	29.00	2/3/59
Lead, St. L.	10.80	11.30	2/24/59
Lead, N. Y.	11.00	11.50	2/24/59
Magnesium Ingot	36.00	34.00	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	162-182	185-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/25/59
Zinc, N. Y.	11.50	12.00	2/25/59

ALUMINUM: 99% Ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. Tin: See above; Other primary prices, pg. 126.



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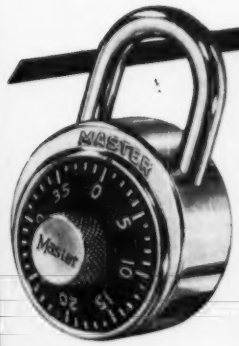

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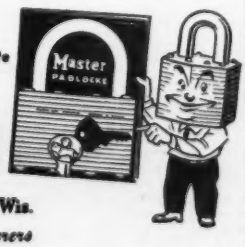

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SHAPES: A wide range to meet your specific requirements. Special shapes to order.

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MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250-3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velsaco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	54.32
Brass, Yellow	47.40	47.94	47.34	50.81
Brass, Low	50.13	50.67	50.07	53.44
Brass, R L	51.09	51.63	51.03	54.40
Brass, Naval	52.08	.....	45.89	55.49
Munts Metal	50.15	.....	45.46	.....
Comm. Bz.	52.14	53.14	52.54	55.66
Mang. Bz.	55.82	.....	49.42	.....
Phos. Bz. 5%	73.82	.....	74.30	.....

Free Cutting Brass Rod 31.99

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $6.90-$7.40; alloy, $14.35; Plate, HR, commercially pure, $5.00-$5.75; alloy, $7.75-$8.50. Wire, rolled and/or drawn, commercially pure, $5.50-$6.00; alloy, $8.00-$9.50; Bar, HR or forged, commercially pure, $4.25-$4.65; alloy, $4.25-$7.15; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.45
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 35.00 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $218 to $221
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $16 to $18
Platinum, dollars per troy oz... $67 to $70
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.125
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.00-30.00
No. 120 ..... 28.00-29.00
No. 123 ..... 27.00-28.00
80-10-10 ingot
No. 305 ..... 33.25-34.25
No. 315 ..... 31.25-32.25
88-10-2 ingot
No. 210 ..... 42.25-42.75
No. 215 ..... 38.00-38.50
No. 245 ..... 33.75-34.25
Yellow ingot
No. 405 ..... 24.00-24.50
Manganese bronze
No. 421 ..... 25.75-26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.75-25.00
0.60 copper max. 24.50-24.75
Piston alloys (No. 122 type).. 24.25-25.25
No. 12 alum. (No. 2 grade).... 21.50-22.00
108 alloy 22.00-22.50
195 alloy 25.00-26.00
13 alloy (0.60 copper max.)... 24.25-24.75
AXS-679 (1 pct zinc) 21.75-22.25

(Effective March 2, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25⅝
Yellow brass	19⅝	18
Red brass	23	22¼
Comm. bronze	23⅞	23⅛
Mang. bronze	18⅝	17⅝
Free cutting rod ends.	19¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27¾
No. 2 copper wire 26¼
Light copper 24
*Refinery brass 25¾
Copper bearing material 25
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27¾
No. 2 copper wire 26¼
Light copper 24
No. 1 composition 22
No. 1 comp turnings 21½
Hvy. yellow brass solids 16½
Brass pipe 17¼
Radiators 17½

Aluminum

Mixed old cast. ..... 12 —13
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 24¾—25¼
No. 2 copper wire ..... 22¾—23¼
Light copper ..... 20¾—21¼
Auto radiators (unsweated). 14¾—15¼
No. 1 composition ..... 18¼—18¾
No. 1 composition turnings.. 17¼—17¾
Cocks and faucets ..... 15 —15½
Clean heavy yellow brass ... 13¼—13¾
Brass pipe ..... 15 —15½
New soft brass clippings .... 15½—16
No. 1 brass rod turnings .... 13 —13½

Aluminum

Alum. pistons and struts .... 6 — 6½
Aluminum crankcases ..... 9½—10
1100 (2s) aluminum clippings 13 —13½
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 6 — 6½
Industrial castings ..... 9½—10
2020 (24S) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 4¾— 5¼
Old zinc ..... 3¼— 3½
Zinc routings ..... 2 — 2¼
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 37-40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 30-32
Old sheet Monel 26-28
Nickel Silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 6½— 6¾
Battery plates (dry) ..... 2 — 2¼
Batteries, acid free ..... 1¾— 2

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 59 —60
Auto babbitt ..... 40 —41
Mixer common babbitt ..... 9½—10
Solder joints ..... 13¼—13¾
Siphon tops 42
Small foundry type ..... 9½—10
Monotype ..... 9½—10
Lino. and stereotype ..... 8½— 9
Electrotype ..... 7 — 7½
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *F3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$113.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective March 2, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*			
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢.
Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box.
* COKES: 1.50-lb. add 25¢.
**ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.

* Electrogalvanized sheets.

(Effective March 2, 1959)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.475 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6*	6.425 *B2*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective March 2, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mas.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	...	...	...	...	...	...	...	...
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	...	...	...	...	...	...	...	...
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50	...	...	...	...	...	...	...	...
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	...	...	...	...	...	...	...	...
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	...	...	...	...	...	...	...	...
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	...	...	...	...	...	...	...	...
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	...	...	...	...	...	...	...	...
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	...	...	...	...	...	...	...	...
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50	...	...	...	...	...	...	...	...
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	...	...	...	...	...	...	...	...
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	...	...	...	...	...	...	...	...
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	...	...	...	...	...	...	...	...
Fontana *K1*	+6.25	...	+2.25	...	0.75	...	1.25	...	1.75	...	2.25	...	2.75	...	...	...	...	...	...	...	...	...
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	...	...	...	...	...	...	...	...
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	...	...	...	...	...	...	...	...
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	...	...	...	...	...	...	...	...
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	...	...	...	...	...	...	...	...
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50	...	...	...	...	...	...	...	...
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

(Effective March 2, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium..	.955	D-3, D-5
Oil hardened manganese	.505	O-2
Special carbon	.38	W-1
Extra carbon	.38	W-1
Regular carbon	.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate 15 pct	Plate 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1958 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective March 2, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	March. Wire Ann'ld ¢/lb.	March. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	...	...	...	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	...	...	...	9.00	9.55
Cleveland *A6*	.....	.....	...	...	...	...	.....
Cleveland *A5*	.....	.....	...	...	...	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	...	...	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184 ‡	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	...	...	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.1!
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	...	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	...	8.65	9.20
Worcester *A5*	179	.....	...	...	...	9.30	9.85
Williamsport *S5*	.....	.....	...	...	...	...	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	16.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41

Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws *Discount (Packages)*

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54 / 42
¾", ⅞", and 1" diam. x 6" and shorter	38 / 23
⅝" diam. and smaller x longer than 6"	.. / ..
¾", ⅞", and 1" diam. x longer than 6"	.. / ..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Discount Stove Bolts
Plain Finish Cartons	60	60
Bulk — *Quantity*		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Discount Square
In Cartons	16	19
In Bulk — *Quantity*		
⅝" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	45.00
Electrodeposited	36.00
Brass, 80-20, ball anodes, 2000 lb or more	47.50
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (18 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*	.....	.....	.....	.....
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99	.....	.....	.....	.....	.....
Boston	.10	9.41	10.50	12.07	9.84	10.12	10.11	10.21	13.45*	16.79	15.79	20.29	19.56
Buffalo	.15	8.40	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	.15	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	.15	8.58	9.65	10.70	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27
Cleveland	.15	8.51	9.69	11.51	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit	.15	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60	.....	8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[3]	11.20-11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11*	.....	.....	.....	.....
Milwaukee	.15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.54	16.34	15.34	19.84	19.09
New York	.10	9.27	10.59	11.20	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.44	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	.15	8.50-8.60	9.70-9.95	11.05	8.76	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	11.50[5]	11.10[6]	9.85[7]	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		9.95	11.55	12.45	10.00	9.70	9.80	10.10	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.10	11.70	12.60	10.65	9.85	9.95	10.75	14.85	17.75	16.95	21.55	20.75
St. Louis	.15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	10.19	11.64	8.99	9.45	9.53	9.70[7]	10.16	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] 4½" x 1" in lots of 1000 to 9999; [5] sheared plate ½" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999; [8] 15 ga. & heavier.

(Effective March 2, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective March 2, 1959)

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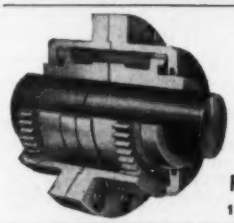
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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:
Carloads, bulk 14.80
Ton lots packed in bags 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads 34.00
Ton lots 36.00
250 to 1999 lb 38.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.
Carloads bulk 12.80
Ton lots, packed 14.45
Carloads, bulk, delivered, per lb of briquet 15.10
Briquets, packed pallets, 3000 lb up to carloads 16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	23.65
98% Si, 1.0% Fe	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
		90% Si....	20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective March 2, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.
Ton lots $3.90
Less ton lots..... 3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight aliowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.
Ton lots per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

LOOKING FOR
LARGE NUTS?

Then contact Acimet, your dependable source for large nuts, milled from the bar! A large stock of full and jam size nuts starting at 1½ inches are constantly maintained in all standards. Extremely high concentricity is maintained by means of the automatic screw machine method. Any thread size, right or left hand. Commercial steel, SAE 1045 and SAE 4140.

FREE
LARGE NUT BUYERS GUIDE

Send for your copy of the Acimet large nut buyers guide. Contains complete specifications and prices on Acimet heavy semi-finished and new finished hex nuts milled from the bar.

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C ELECTRIC FURNACE STEEL CASTINGS

are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

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The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

CRUCIBLE STEEL CASTING CO.
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are saving money with
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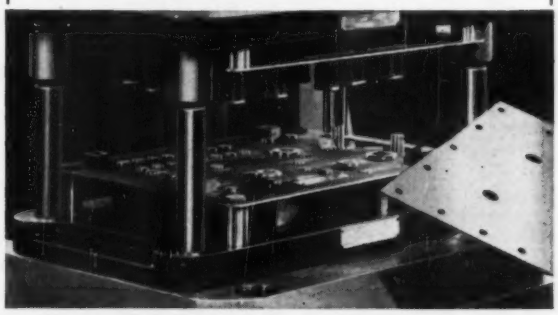
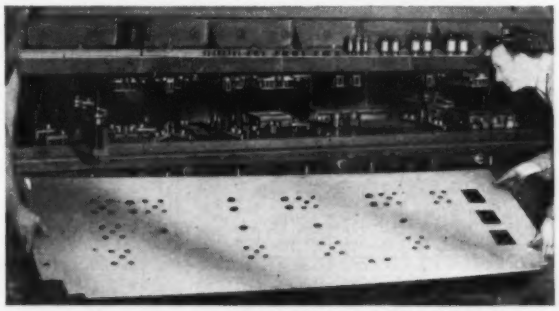
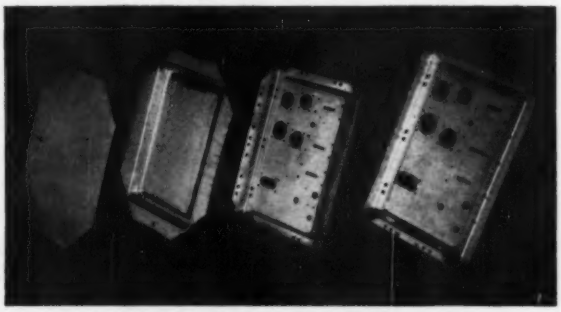


MAGNETIC PERFORATING DIES
All parts reusable and interchangeable. Punches and dies stocked in .001" increments from .100" thru .500" dia. Larger sizes available.



ADJUSTABLE PERFORATING DIES
All parts reusable and interchangeable. Punches and dies stocked in .001" increments from .100" thru .500" dia. Larger sizes available.



manufacturer of all types of CUSTOM DIES for over 40 years

WRITE FOR COMPLETE DETAILS

S. B. WHISTLER & SONS, INC.
754 Military Rd., Buffalo 23, N. Y.

Mail the following: ☐ Magna-Die Catalog ☐ Adjustable Die Catalog
☐ More information on custom die work

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____

ELECTRICAL POWER
EQUIPMENT IN STOCK
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3000	New Elliott	Enc. F.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
1	2250	New Elliott	Enc. F.V.	600	200/300
1	2200	G.E.	MCF	600	400/500
1	1750	New Elliott	Enc. F.V.	250	175/350
8	1500	New Whse.	Enc. F.V.	525	600
1	1375	G.E.	MCF	415	1300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
1	940	Whse.	QM	250	140/170
2	940	S.B.	Enc. F.V.	600	800/1000
2	600	G.E.	MCF	250	400/750
2	750	G.E.	MCF	600	450/900
1	750	G.E.	MCF	600	300/720
1	750	G.E.	MCF	600	120/360
2	645	S.S.	Enc. F.V.	300	1000
4	600	Whse		250	275/550
1	500	G.E. B.B.	TLF-2656H	250	2000/3500
1	500	G.E.	MPC-10	250	188/400
2	400	Whse.		550	415
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
2	300	G.E.	MPC	230	400
2	275	G.E. B.B.	TLC-108	250	2000/4000
1	225	G.E. B.B.		250	1150/3600
1	200	Rel. B.B.	T-664-D.P.	240	850
1	200	Whse.	CB-207-4	250	850/1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E. B.B.	TLC-74	250	1150/3500
1	150	G.E. B.B.	CD	600	250/750
1	120	G.E. B.B.	TLC-50	230	1250/5000
1	125/150	New Whse.	CB-210.3	230	300/1200
1	120	Rel. B.B.	1050T	230	575/900
2	125	Whse.	SK-190	250	450/1200
1	125	Whse.	SK-185	230	850/1050
1	100	G.E.	CDP-115	230	1750
1	80	Whse.	SK-123.9	240	2000/4500
1	75	Rel. B.B.	T-663 D.P.	240	500/1000
1	75	G.E. B.B.	CD-1235-D.P.	600	850
1	60/75	Rel. B.B.	T-664-D.P.	240	300/1200
1	50	G.E.	CD-1136	230	690/1050
1	40	Rel. B.B.	TY 663	240	300/1200
1	25/33	Rel. B.B.	TY563	240	300/1200
1	60	Rel. B.B.	T-406-D.P.	240	1750/2400
1	50	G.E.	CD-1136	230	690/1050
1	40	Rel. B.B.	T-405-D.P.	240	1750
6	40	Rel. B.B.	385F. TEFC	230	500/1500
1	30/40	Rel. B.B.	T-564-D.P.	240	300/900

MERCURY ARC RECTIFIERS

3—150 KW. G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
2—150 KW. G.E., Ignitron, 245 V. D.C.—230 V. A.C., air cooler transformers with controls.

MG SETS—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	600	600	11000/6600
1	1500	SS. 3 unit	720	600	11000/6600
1	1500	Cr.Wh. 4 unit	720	100	2300
1	1000	G.E.	720	600	6600/13200
1	750	G.E.	720	250/300	6600/13200
1	500	G.E.	900	125/250	440
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	240	Whse.	900	125	220/440
1	200	G.E.	1200	250	440/550
1	200	Whse.	1200	550	2300
1	200	El.Mfg.	1200	250	2300/480
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
1	140	Cr.Wh.	600	125/250	2300
1	125	G.E.	1800	250	220/440
1	100	G.E.	1170	250	220/440
1	100	Cr.Wh.	1800	240	440
2	100	Cr.Wh.	1160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA.	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	18800 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	CA/FA	1	13800 x 230/460
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Kuhl	QISC	1	2300 x 6600
3	333	G.E.	HS-W4R	1	2400/4160 240 x 480
3	333	G.E.	OISC	3	2400/4160Y x 600
3	150	G.E.	QISC	1	2300x2300/4000Y
3	100	Whse.	SK	1	4600x460/230/115
8	100	L.M.	LA	1	4160/7200x240/480

CRANE & MILL MOTORS
230 V., D.C.

Qu.	H.P.	Make	RPM	Type
14	12/15	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5, Series
2	23	G.E.	650	MDS-406
2	25	G.E.	725	CO-1808, Series
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	CDM-1830 Comp.
3	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AE B.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	100	G.E.	475	CO-1832 S.B.
6	100/140	Whse.	500/415	MC-90 R.B.

RE-NU-BILT By

BELYEA COMPANY, INC.

47 Howell St. Jersey City 6, N. J.

Tel. OLdfield 3-3334

Philadelphia Sellers Suffer Profit Pinch

Used machinery is moving at a fair rate in the Delaware Valley market.

But often, dealers say, it's strictly a matter of exchanging their old inventories for new ones at little profit.

▪ Philadelphia area used machine dealers are trying to live with a lack-luster market and hoping it will get better.

Here are some of their comments on present conditions:

"Compared with a year ago we're moving a good volume of equipment. But the mark-up is terrible."

"If there are any straws in the wind we can't find them. There are a lot of promising deals we develop right up to the final approval from management. Then they fall through."

"We're selling some equipment we've had around for a long time. But it's strictly a case of trading dollars. Everyone is bargain hunting. Anyway we are getting rid of machines we're tired of seeing,"

Interest Is High—Most dealers frankly admit current sales are below December-January levels. And they see few signs of any spring pick-up.

There are some causes for encouragement. Inquiries are plentiful. One dealer says a recent circular he sent out drew more response than any mailing in the last two years.

. . . And Some Goods Move—Toolroom and sheet metal equipment continue showing more strength than production items.

However, some recent interest in production units is also bolstering hopes. More inquiries about turning and grinding equipment are coming in, dealers say. This may means, they feel, that users are getting more long-run production jobs and will need to beef up tooling to handle it.

. . . But Profits Are Poor—The discouraging price and profit picture is getting the most comment. And as always prices on the open market remain far below those at auctions. One dealer lists this experience at a recent sale to prove the point. He was commissioned by a Philadelphia-area manufacturer to buy a needed machine.

His instructions were not to go above $22,000. Before the sale he believed the unit would sell for $15,000-$17,000. It actually went for $29,000. "And I never even had a chance to bid," the dealer concludes.

Convention Plans

The Machinery Dealers National Association is completing plans for its annual convention at the Plaza Hotel in New York, May 13-15. During a recent meeting of the group's board of directors the MDNA Dealer of the Year was selected. His name will be announced at the convention.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10 Ga. Bertsch No. 6 Initial Type
12 x ⅝" Hilles & Jones Pyramid Type
32' x ¾" BALDWIN PYRAMID TYPE—LATE

CRANES—OVERHEAD ELECTRIC TRAVELING
8 ton P&H 55' Span 230/3/60
10 ton P&H 39' Span 230 Volt D.C.
10 ton Milwaukee 57' Span 230 Volt D.C.
10 ton Shaw 48' Span 230 Volt D.C.
10 ton Whiting 75' Span 220/3/60 A.C.
10 ton Shaw 120' Span 230 Volt D.C.
15 ton N-B-P 100' Span 220/3/60 A.C.
120 ton Shepard Niles 77' Span 230/3/60

CUT-OFF
Modern Model 2E, Capacity ⅛" to 2" dia.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

FORGING MACHINES
1" to 5" Acme, Ajax, National

GEAR REDUCERS
3000 H. P. United (2), Ratio 16.2-1 & 11.6-1

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. incl.

HEADER
#14 Waterbury Farrel DSOD. Capacity ⅝" x 6"

LEVELERS—ROLLER
12" Waterbury Farrel 9 Rolls 6" Dia.
24" McKay 17 Rolls 2⅜ Dia.
50" Processor & Leveler, Capacity 50" x .109"
66" Guide 17 Rolls 4½" Dia.
72" Leveler 17 Rolls 2⅝"

MOTOR
800 H.P. Westinghouse 2200/3/60 505 RPM

MULTI SLIDE MACHINE
No. 35 U.S. Multi-Slide, Max. Capy. 4¼" wide x .089

NIBBLER
Pullmax Model 2, Capacity 11/32"

PRESS—EMBOSSING & COINING
#664 Toledo 600 ton, 2" Stroke

PRESSES—HYDRAULIC
300 ton Southwark, Bed 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Birdsboro, Platen 48 x 48", Stroke 15"
1000 ton HPM Fastraverse, Bed 48" x 72", 36" Stroke
4500 ton B-L-H Bed 68 x 68", Stroke 40"

PRESSES—STRAIGHT SIDE
190 ton Toledo #57½, Bed Area 29x29", Stroke 10"
215 ton Clearing, Bed Area 36x42", Stroke 24"
260 ton Cleveland #7F, Bed 42 x 84", Stroke 12"
500 ton Hamilton #1810¼, Area 19x17½" Stroke 1½"
900 ton Hamilton 4E-1809, Bed 101x181", Stroke 30"

PUMP
250 GPM Aldrich Vertical Triplex 4¾x9", 1500# Pressure, with 250 H. P. Motor 2300/3/60

PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
EF Cleveland, 60" Throat

ROLLING MILLS
6" x 5" Torrington Flate Wire Mill Line
3¼" x 7" Six Roll Cluster Mill
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Two Stand Two High
20" x 36" Single Stand Two High
26" x 60" Single Stand Two High

ROLLS—FORMING
6 Stand Dahlstrom #450-6 for stock to 4½" wide
18 Stand Custom Built, 2½ Shaft, will take 36" wide

SHEAR—ROTARY
#40A Quickwork Whiting, ⅛" Capacity

SHEARS—SQUARING
6" x 14 Ga. Edwards, Motor Drive—LATE
10' x ¼" Bertsch
12' x 3/16" Cincinnati #1412

SLITTER
24" Torrington Slitting Line, 3½" Arbor

STRAIGHTENERS
Torrington #1734 12-Roll, Capy. 1¾", Rd. 1-9/16"
⅝" Shuster Straightener, 12 Ft. Cut-off

SWAGING MACHINES
#4 Torrington 2-Die, Capy. 2" Tube, ⅝" Solid
#6A Fenn, Capy. 3¾" Tube, 1¼" Solid, 10" Die Length, With Hydraulic Feed

TESTING MACHINES
20,000 lb. Baldwin Univ. Hydraulic
60,000 lb. Southwark-Emery Universal Hydraulic
100,000 lb. Olsen Universal Hydraulic
100,000 lb. Olsen Universal Beam Type
500,000 lb. Olsen, Super DeLuxe Compression

THREAD ROLLER
#60 Waterbury Farrel, Max. thread dia. 1"

TRIMMER
Streine Side Trimmer 48" Max. Width, Capy. 2 Cuts 3/16"

TUBE REDUCERS
1½" Tube Reducer for steel
2½" Tube Reducer for steel

WIRE DRAWING MACHINES
Type B Morgan 4-Block Capy. #5 Rod down
Scudder 3-Block 20 Dia. ⊕
Superior 7-Draft Cone Type, Capy. 14 Ga. down .0364

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All Types
SERVICE-TESTED
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For All Types of Cars
LOCOMOTIVES
Diesel, Steam, Gasoline
Diesel-Electric

SPECIAL
STANDARD GAUGE CARS
10 COVERED HOPPER CARS
70-Ton Capacity
ORE HOPPER CARS
660 Cubic Feet
40- and 50-Ton Capacity

RAILWAY TANK CARS and STORAGE TANKS
6,000- 8,000- and 10,000 Gallon
Cleaned and Tested
CRANES
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"ANYTHING containing IRON or STEEL"

FOR SALE
1—8" Diameter x 10" face 2-Hi Cold Mill
1—No. 22 Canton Alligator Shear 3" Rd. Cap.
1—3" Rd. Cap. Open End Vertical Bar Shear
1—2¾" Cap. Buffalo Billet Shear
1—12" Dia. x 16" face 2-Hi Skin Pass Mill
ALBERT CURRY & COMPANY, INC.
3519-21 BEGELOW BOULEVARD, PITTSBURGH 13, PA.

EST. 1904
DAVIDSON PIPE COMPANY INC.
ONE OF THE LARGEST STOCKS IN THE EAST
Seamless and Welded ⅛" to 26" O.D.
All wall thickness Manufactured.
Specialty large sizes.
Cutting — Threading — Flanging — Fittings — Valves.
Call GEdney 9-6300
50th St. & 2nd Ave., B'klyn 32, N. Y.

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eastern Rebuilt Machine Tools
THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

PLAIN MILLING MACHINES
No. 1B Milwaukee, m.d. in rear
No. 2 Cincinnati H.P., m.d.
No. 2K Kearney & Trecker, m.d.
No. 2B Brown & Sharpe, m.d.
No. 3B Brown & Sharpe, m.d.
No. 3B Milwaukee, m.d.
No. 3SP Van Norman, m.d.
No. 4 Cincinnati Plain H.P., m.d.
No. 4B Brown & Sharpe, m.d.
No. 5 Cincinnati H.P., m.d., late
No. 2LP Van Norman, m.d.
No. 36 Van Norman Ram Type, m.d.
No. 2MA Cincinnati, m.d.

THREAD MILLING MACHINES
10x48" Hanson & Whitney Universal Semi-Automatic, m.d.
12x36" Lees-Bradner Universal Type, m.d.
12x54" Lees-Bradner Universal Type, m.d.
12x102" Lees-Bradner Universal Type, m.d.
No. 40 Lees-Bradner Automatic Universal, m.d., late

UNIVERSAL MILLING MACHINES
No. 2 Brown & Sharpe Light Type, flanged, m.d., late
No. 3A Brown & Sharpe Standard Type, m.d. late
No. 2 Kempsmith Master-Mill, Model KMB
No. 3K Kearney & Trecker, m.d.
No. 22 Lu Van Norman Ram Type, m.d.

VERTICAL MILLING MACHINES
No. 0B Cincinnati, m.d., latest
No. 1-14 Kent Owens, m.d.
No. 2 Brown & Sharpe Light Type Swivel Head, m.d.
No. 2H Kearney & Trecker, m.d.
No. 2K Kearney & Trecker, m.d.
No. 3 Standard Kearney & Trecker, m.d.
No. 3VG Reed Prentice Vertical Miller & Die Sinking Machine, m.d.
No. 4 Cincinnati H.S., Dial Type, m.d.
No. 4K Kearney & Trecker, m.d.
No. 5H Kearney & Trecker, m.d. in base
No. 40 W. B. Knight, m.d.
No. 8½D Gorton Super Speed, m.d., new

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times

THE EASTERN MACHINERY COMPANY
1002 Tennessee Avenue, Cincinnati 29, Ohio
MElrose 1241 CABLE ADDRESS—EMCO

ROLLING MILLS — STEEL WORKS EQUIPMENT

1—AUTOMATIC COOLING BED FOR BARS up to 2" dia. consists of run-in table, cascade section, shuffle bar section, runout table, with all electrics, 200 ft. long.
1—21" & 52" x 77" TANDEM COLD REDUCTION MILL, 4-high, 3 stands.
1—18" & 48" x 42" TANDEM COLD REDUCTION MILL, 4-High, 5 stands.
1—28" x 40" HOT STRIP MILL, 2-high, reversing, with 2500 HP D.C. motor generator, etc.
1—25" x 42" x 66" HOT STRIP MILL, 4-high.
1—16" x 22" COLD MILL, 2-high.
1—8 x 10" COLD MILL including uncoiler recoiler and edging rolls.
2—28 3-HIGH ROLL STANDS.
1—New 16" BAR MILL, one 3-high roll stand, pinion stand.
1—New 12" BAR MILL, four 3-high stands, pinion stand.
1—12" MERCHANT BAR MILL with 18" roughing mill and heating furnace.
1—9" BAR MILL, 3-high.
2—MORGAN TRAVELING TILTING TABLES for 24" 3-high bar mill.
1—34" x 192" ROLL GRINDER.
2—65-TON ELECTRIC MELTING FURNACES, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.
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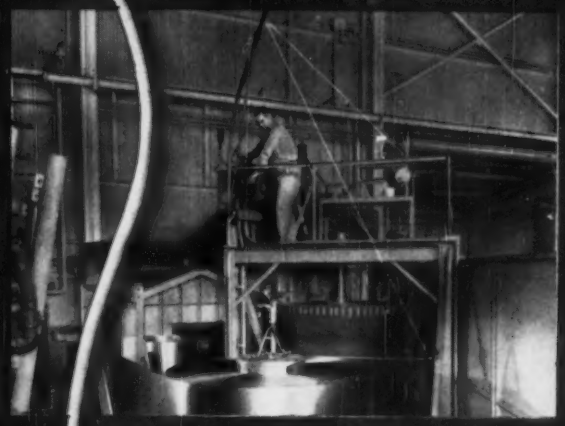

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